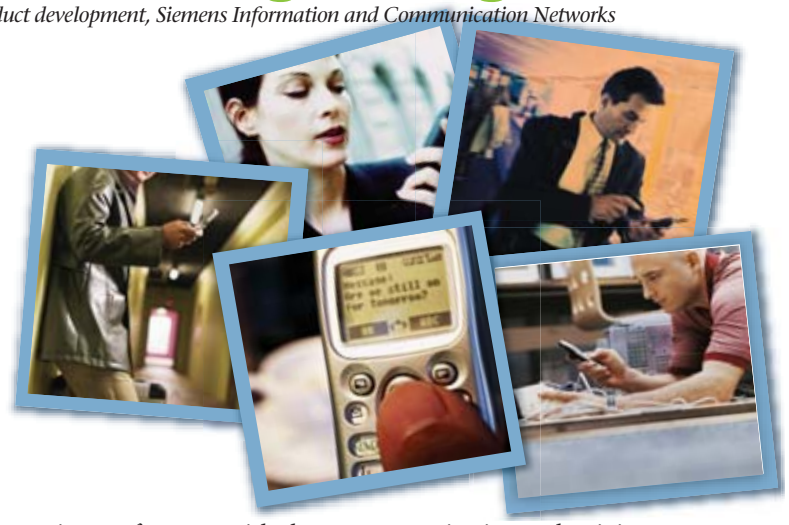
THE WIRELESS JOURNAL®

VOLUME 11 / NO. 4 | TESSCO News and Product Review for Wireless Communications Professionals | OCT/NOV/DEC 2004

Wi-Fi x 5: How 802.11g Changes the Mobility Picture

By William J. Beyda, vice president of product development, Siemens Information and Communication Networks



Within the next few years, users will view simple cell phones without PDA features as primitive voice devices found alongside rotary phones in technology museums. A new breed of feature-rich, highly integrated smart mobile devices will take their place and these devices will combine multiple-band, 3G wireless and broadband Wi-Fi-enabled communication with anytime, anywhere information access, all revolving around presence-awareness.

Presence-awareness is similar to instant messaging's buddy lists that show who among someone's circle of online friends and associates is connected at any given time. With it, users can register their availability and communication preferences with the network. In turn, the network can provide an aggregate view of all registered users' availabilities and communication preferences such as wired phone, wireless, e-mail or instant messaging.

Mobilizing this capability has powerful implications for quantum gains in productivity across most every industry and profession, especially in those areas requiring complex project management and time-sensitive responses.

Fundamental to this new mobility and collaborative paradigm are the 802.11 standards for Wi-Fi. In 2003, the IEEE released the 802.11g standard with data rates of up to 54 Mbps. The migration to 802.11g is important because speed matters. The slower 11 Mbps data throughput of the popular 802.11b can slow even further to just a few megabits per second in poor coverage areas. Although e-mail, fast Internet access and VoIP conversations can operate at these speeds, video applications and sharing large files will benefit from the faster speed of 802.11g.

Although Wi-Fi was conceived as a way to set up Ethernet LANs without the cost and trouble of hardwiring, the concept rapidly expanded beyond corporate offices into private WLANs for the home and public WLANs or hot spots. These public WLANs are appearing in hotels, airports, cafes, public parks and even air-

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Defeating NLOS and Cost to Win Last Mile Business

By Eric Lee, president and CEO, Solectek

To many industry insiders, the promise of broadband wireless access (BWA) is clear. The goal is delivery of last mile, enterprise infrastructure and MAN traffic at lower cost than incumbent technologies—ADSL, cable modem, T1/E1, etc. The reality can be best characterized as hit or miss. The current-generation technology is sufficient to meet the business needs of datacom customers in some niche markets. For example, BWA growth in domestic rural and some lesser-developed countries has been strong. But this growth has not been seen in the majority of urban and suburban centers due to the strong presence of competing technologies. In other words, BWA has grabbed hold only in markets where other technologies are absent. What has relegated BWA to remain a niche technology? Two reasons: non-line-of-sight (NLOS) coverage and cost.

Both issues boil down to technology. Advancing beyond traditional line-of-sight (LOS) deployment means developing technologies that can handle the added impairments of NLOS operation. Doing this inexpensively requires smart architecture choices and high levels of integration to drive hardware costs down. Delivering both in a single, reliable radio is today's challenge.

NLOS Impairments

Operating in an NLOS environment subjects a radio to a number of severe impairments that must be managed

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The Nextel / FCC Spectrum Reallocation: What Does It Mean for You?

By Alan Tilles, Esquire, Shulman, Rogers, Gandal, Pordy & Ecker, P.A.

The FCC recently voted to adopt a Re-Banding Plan for the 800 MHz band. The following is a summary of the Order:

1. 800 MHz public safety licensees in the NPSPAC band (866-869 MHz) will move to the bottom of the old General Category channels (851-854 MHz).
2. Incumbents in the 851.0125-854.7625 MHz bands move to the 854.0125-861.9875 MHz spectrum.
3. No licensee operating from 854.7825 to 860.9875 MHz is required to move. However, existing public safety licensees operating from 859.0125 to 859.9875 MHz can move to lower channels.
4. No public safety or critical infrastructure licensee will be required to move into 861.0125-861.9875 MHz bands.
5. Nextel will give up its 800 MHz spectrum from 851.0125 to 861.9875 MHz. (Not the change from the original proposal, in that Nextel will now also be giving up its 861.0125-861.9875 MHz spectrum.) Nextel will also give up its 700 MHz licenses, but will KEEP its 900 MHz licenses.

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At a Glance

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- Find out how to use communications systems analyzers for remote system monitoring. See page 3

Network Infrastructure

- Use Motorola Canopy's wireless ISP marketing kit to expand your customer base and market reach. See page 5
- Extend the 5.8 GHz range and receive more data per sector than ever before with Solectek SkyWay 5000 base station antennas.

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Mobile Devices & Accessories

- Ritron's Liberty™ Extender Repeater System virtually eliminates shadowing, fading, and dead spots for two-way radio applications.

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- Stico's interoperable antenna system enables first responders from different agencies to communicate seamlessly during critical incidents. See page 17

Install, Test & Maintenance

- Remove those fine scratches and abrasions from cell phones and PDAs. Novus Fine Scratch Remover has a multitude of uses. See page 25

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Wi-Fi x 5: How 802.11g Changes the Mobility Picture

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planes. This ubiquitous Wi-Fi has set the stage for second-generation IP, or 2gIP, applications to take the scene.

2gIP applications leverage open IP-based standards, such as the Session Initiation Protocol (SIP), to bind telephony's real-time communicative power with business applications and processes. These 2gIP applications, accessible via wireless devices, can aggregate the presence of a workgroup's members, who in turn can specify their availability and media preferences. If members are needed for any reason at any time, their availability is known and the appropriate communications can be initiated, allowing the other team members to reach them immediately with point-and-click simplicity. In addition to checking availability and setting up an audio conference, users are offered such features as videoconferencing, document sharing and whiteboarding.

Say, for example, that a critical project encounters a problem that needs immediate attention. The project leader just landed at Chicago's O'Hare International Airport and discovers the problem upon checking voice mail. Clearly she needs to consult key team members immediately to figure out the next steps. Unfortunately, her connecting flight leaves in an hour and her team is spread across three time zones, some in branch offices, some working from home and a couple others traveling.

Previously, the project leader would have had to make numerous time-consuming phone calls to assemble a conference quorum, connecting with a few but leaving voicemails for others. If documents were required, such as contracts or schematics, an e-mail step was also necessary.

However, with broadband wireless and a 2gIP presence-aware collaborative tool, her options completely change. With her laptop, PDA or integrated smartphone, she quickly invokes the application's presence portal, scans the team members' availabilities, selects those who are needed and available, selects the documents to send and clicks to set up a multi-party conference complete with shared documents.

With that single click, the application sets up the outbound conference and e-mails documents. It also handles the mixed media that some may need to join in the call, if perhaps one or more can join in only via instant messaging because they're in a meeting or already on another teleconference. Does our project leader make her plane? With 2gIP, she has a good chance.

In the coming years, the combination of presence-aware collaborative tools with 802.11g's anywhere/anytime, 54 Mbps wireless access will wholly transform how we work, play, learn and interact both with others and with information. Given the rapid progress of IP convergence of fixed and wireless domains as well as private and public networks, it is likely that a single, highly functional wireless device will be all we need to take our world with us while we move around—always connected, but in control, and with no penalty for being mobile.

This article has been reprinted from the September 1, 2004, issue of Wireless Week *with permission.*

Certifying Cable Installations on Time and Without Penalties

By Hugo Draye, marketing manager copper certification, Fluke Networks

The Importance of On-time Certification

All professional cabling installations require certification. Most installation projects have a hard deadline and any delay or schedule slip can have major financial consequences. Contractors often pay penalties for each day the project is behind schedule. This certification phase is the last phase of a project, and is often squeezed in order to complete the project on time, which could result in overlooked problems which have to be fixed later. In other cases, contractors put in overtime to get the certification phase completed before the deadline.

A cable certification tool that provides a fast, accurate, complete solution that streamlines every aspect of the certification job is critical to this phase of the installation—from setup, to record-fast testing and troubleshooting, to reporting results to the customer. The right tool can save contractors considerable time and money.

Total Time to Certify

The certification process generally requires two technicians working as a team. One technician connects the main unit of the tester to the link under test at the patch panel in the telecom room (TR). The other technician connects the remote tester to the outlet at the other end of the link under test. Every link is tested in this way.

"Total time to certify" means the amount of time to achieve the following objectives:

1. Connect to the link under test on both ends
2. Execute the test
3. Save the test results data
4. Move and be ready to connect to the next link.[1]

All links need to pass the performance requirements before the job can be considered complete.

If the contractor can't complete the work in day shifts, he/she will either have to pay

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The Nextel / FCC Spectrum Reallocation: What Does It Mean for You?

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6. Nextel will get 10 MHz (two five-MHz blocks) at 1.9 GHz.
7. The FCC valued the 1.9 GHz spectrum at $4.8 billion. The Commission will give Nextel credit for (1) the spectrum that it is giving up and (2) the money it pays incumbents to reband. Nextel will then pay the difference (if any) into the U.S. Treasury.
8. Nextel must put up a $2.5 billion Letter of Credit to cover 800 MHz retuning costs.
9. An independent Transition Administrator will be appointed to oversee the administrative and financial aspects of retuning, with the Commission retaining authority to review disputes.
10. The U.S. Comptroller General is to review the legal aspects of the plan, and the Commission retains the right to stay the implementation IF the Comptroller General finds unambiguously that it violates federal law.
11. The FCC adopted an Enhanced Best Practices regime to deal with interference before rebanding is completed.
12. 900 MHz B/ILT licensees will be able to convert their authorizations to commercial operation.
13. The FCC has deferred a decision on Canadian and Mexican Border Band Plans, until it can work with the respective governments. Thus, the Band Plan information reviewed above applies only to non-Border areas.
14. The FCC wants rebanding completed in 36 months.

The FCC's Order, Summaries and related documents may be found here: http://www.shulmanrogers.com/CM/Custom/800MHZ.asp

Overcoming Passive Intermodulation in Antenna Design

Submitted by Dave Daniel, director of product management, antenna products, Sinclair Technologies Inc.

Passive intermodulation (PIM) products are becoming a problem in wireless communications system design for the following reasons:

- Regulatory bodies are maximizing spectrum capacity through reduced bandwidth.
- Towers are being shared and the number of antennas used for transmit and receive functions reduced.
- Equipment providers are increasing transmit power levels and reducing receiver sensitivity.
- Equipment providers are providing trunked architectures, enabling multiple channel operation in VHF and UHF bands.

With proper low passive intermodulation devices and installation procedures much can be done to reduce the effects of this problem.

About Passive Intermodulation

Passive intermodulation is the production of new, unwanted signal frequency components in passive, nonlinear devices commonly found in and around radio sites. These new signals can land on existing transmit or receive frequencies on the same or an adjacent site, causing interference.

A partial list of devices that, when frequencies are mixed, could potentially generate passive intermodulation products, includes the following:

- Cables
- Connectors
- Adapters
- Tx line junctions (such as tee and stars)
- Filters
- Directional couplers
- Antennas
- Surge protectors

Contributing Factors to Low-PIM Signal Generation

While standards are still under development, an acceptable PIM level is –150 dBc as the magnitude for third-order intermodulation products using two 20-watt transmitters. To achieve this low level of intermodulation, designers are focusing on corrosion in metal joints and interfaces, joins and surface irregularities.

Checklist of PIM-reducing factors:

- ✓ Avoid ferromagnetic materials.
- ✓ Ensure sufficient plating thickness if ferromagnetic base material is used.
- ✓ Minimize the number of joint or contact points.
- ✓ Avoid using dissimilar metal contact.
- ✓ Ensure sufficient separation between dissimilar metals.
- ✓ Perform firm, complete soldering/welding or brazing of joints where possible.
- ✓ Avoid improper solder joints as they can break and/or corrode.
- ✓ Ensure that contact interfaces are free of debris.
- ✓ Ensure high contact pressure.
- ✓ Use silver-plated, soldered center pin, 7/16 DIN connectors whenever possible.
- ✓ Specify torque values for butt joints.
- ✓ Avoid crimp joints.

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Baffled by Wi-Fi Connectors?

By Connie Jones, director of product management, RF Connectors, division of RF Industries

Today's wireless market utilizes many new, and some familiar, coaxial connectors. The wide range of wireless broadband equipment now available to meet Wi-Fi IEEE 802.11a/b/g requirements can sometimes seem bewildering.

What are the input and output connectors used with Wi-Fi-certified products, which include access points, gateways, routers, cellular devices, point-to-point networks, Bluetooth, antennas, residential gateways, PDAs, PCI cards, PCMCIA cards, USB devices, wireless print servers, WLAN-enabled computers, PC peripherals, antennas, LANs and Internet access devices? Many of these connectors are not easily recognizable so read on for help in identifying them.

Variations on old standards

In addition to specialized interfaces that are relatively new to the coaxial market, such as DMX, MC Card, MHF, there are variations on standard RF connectors' styles that satisfy FCC Part 15 and 802.11 requirements. The most popular compliance method creates reverse polarity, or gender, versions of BNC, MCX, MMCX, N, SMA, SMB, SSMB and TNC connectors. You will also find reverse, or left-handed thread, versions of N, SMA and TNC connectors. Another compliance method replaces unified threads with metric threads to prevent mating with standard connectors. (If you try to mate threaded connectors, stop at once if you meet any resistance! You may be working with a device connector having reverse or metric threads. To force mating can result in damage to both connectors.)

When choosing adapters or pigtails for your Wi-Fi devices, you will gain better performance by using straight rather than right-angle connectors. If you have a choice, consider the trade-off between compactness and performance.

Specialized Wi-Fi connectors

MC Card connectors were designed for wireless and telecom devices operating at frequencies up to 8 GHz where board and chassis space is limited. They are used on many Apple, Buffalo, Dell, Enterasys, Filotex, Lucent, and Proxim/Orinoco products.

DMC connectors are specialized snap-on connectors designed for DC to 6 GHz and are larger than the MC Card connector. They are compatible with Orinoco AP600 and AP4000 devices.

MCX connectors share the same inner contact and dielectric dimensions as SMBs, but the outer diameter is approximately 30 percent smaller. MCXs offer broadband performance from DC to 6 GHz and coupled connectors can be rotated 360 degrees for precision alignment without performance loss.

MCX plugs have a center pin, insulation that extends beyond the pin, and six slotted spring fingers surrounding that insulation. The MCX plug inserts into the jack body. MCX jacks have a larger diameter body which houses the locking mechanism for the plug's springs, recessed insulation and a slotted socket contact. MCX connectors are found on Apple Airport Extreme and SMC devices.

MMCX, miniature MCX connectors, are about half the size of SMBs. Their lock-snap coupling mechanism allows 360 degree rotations without loss of broadband performance with low reflection from DC to 6 GHz. MMCX connectors are used on devices manufactured by 3Com, Cisco/Aironet, EnGenius, Proxim/Orinoco, Samsung, Senao and Symbol.

MMCX plugs have no shell, a center pin and a visible external snap-ring. MMCX jacks have a larger body, center socket contact and internal spring slots to receive the external snap-ring of the plug. To differentiate MCX and MMCX plugs, remember that the MCX has slotted external spring fingers while the MMCX has a solid external contact with snap-ring.

Reverse MMCX plugs have the dielectric and center socket of the MMCX jack inside the MMCX body. If you find a socket contact in a body with external snap-ring, you have an RP MMCX plug. They will not mate with standard MMCX jacks. To attempt to do so will damage contacts in both connectors. All performance and function characteristics of the

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Defeating NLOS and Cost to Win Last Mile Business

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properly for a link to remain reliable. NLOS obstructions create higher link attenuation than is predicted by the free space path loss equation. Transmission models normally address this by adopting a faster rate of RF level attenuator as distance is increased In addition, a fixed shadowing term is added to address single instance obstructions such as a rooftop or walls.

The more drastic effect of NLOS transmission is the increased severity of multipath and its effects. Multipath can be likened to an acoustic echo—RF reflections received by the radio from multiple, indirect paths. The echoes, although attenuated from the main path (if there is one), are delayed in time. The distribution of echoes over time, or delay spread, create intersymbol interference (ISI), a condition in which the delayed energy from one transmitted data symbol begins to corrupt the symbol next arriving along a faster RF path.

Another consequence of multipath is fading. As waves of the same frequency, the radio is sensitized to peaks and valleys of power that are created by the overlapping waves. The effects can be severe: narrowband fades on the order of 20 dB and more are possible when the receiver is repositioned by only inches. Moreover, since the multipath is often created by moving objects—trees, cars and to a lesser extent, buildings—the distribution varies as a function of time as well as position.

A final consequence of multipath involves the motion of reflecting objects. Any wave that hits a moving object, for example a car, will experience a slight frequency shift. This Doppler effect creates echoes that are not only distributed in time but also in frequency.

Implementation Example

In all, reliable NLOS links require a radio system able to tolerate increased path loss and a number of distorted echoes of the original signal. How can this be accomplished?

For the past 15 years and more, most BWA equipment consisted of low-power, single-carrier and DSSS radios. Suitable for LOS applications, their utility in NLOS links decreases dramatically. Their low power and average receive sensitivity do not allow them to operate in the presence of increased path loss, shadowing and multipath fades. LOS link distances to 10 miles and more quickly deteriorate to under a mile due to power loss. In addition, these older systems are not designed to easily survive the ISI and other distortions created by delay spread and Doppler effects.

Orthogonal frequency division multiplexing (OFDM) modulation has been growing in usage due to its ability to overcome the shortcomings of earlier commercial technology. Technology sectors such as 802.11a/g WLAN, DVB/DAB broadcast and upcoming 802.16 WMAN products are all looking to OFDM to address NLOS challenges. For outdoor use, OFDM is a powerful asset.

OFDM creates a wideband signal comprised of a number of independent or orthogonal subcarriers, each carrying a low bit rate data stream. The low data rate bit stream allows for a sizeable guard band at the beginning of each symbol, effectively isolating the symbols from each other and neutralizing the effect of delay spread. In addition, the subchannelized operation, in conjunction with the proper error correction system, proves to be very tolerant of narrowband multipath fades. In most cases, only a limited number of subcarriers may be affected by a fade, causing the loss of symbols. With the remainder of the wideband signal unaffected, the error correction system takes over and is able to reconstruct the small percentage of missing data bytes.

OFDM is a key element of the NLOS solution, although additional tricks are required to begin approaching the holy grail of indoor deployment. The sheer magnitude of the link loss between a base station and a NLOS client, due to obstructions and multipath fading, mandates that additional measures be taken to increase link gain.

The most obvious is to increase the link gain of the system by increasing the output power of the transmitting radio or receive sensitivity of the receiver. Due to strict linearity requirements for an OFDM system, a high-power OFDM radio requires more care design and construction than previous generations of design.

Recent developments to combat link attenuation involve using sophisticated methods of spatial and time diversity. Space-time coding and multi-input/

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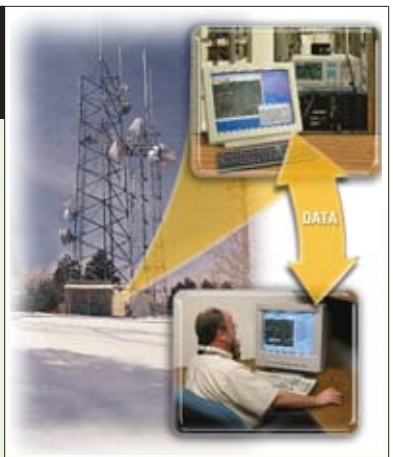

Remote System Monitoring with Communications System Analyzers

By Katrina Scally, software engineer, General Dynamics

In large distributed communications systems, it is often necessary to locate base station equipment in remote locations, such as mountaintops, to take advantage of their geographic features. These systems also require frequent monitoring and adjustment for optimum performance. Together, these two requirements present a significant challenge to those responsible for maintaining and servicing these sites.

Traditionally, when a remote site requires maintenance, the service technician must bring all equipment necessary to handle any possible problem or risk having to make multiple trips to the remote site. A remote monitoring and control application provides the technician with an indication of scope of maintenance prior to visiting the site, permitting him to transport only the necessary equipment.

Using readily available off-the-shelf software and consumer electronics, maintaining optimal performance of remote communications sites is easy and cost effective. By remote operation of a communication analyzer from a single Central Command site, a technician can identify specific maintenance needs, eliminate unnecessary trips, and maintain multiple remote base stations with a reduction of personnel and equipment.

Remote Monitoring Solution

Using a stand-alone personal computer (PC) with a communications system analyzer for remote monitoring, the service technician can monitor all aspects of the base station. All of the analyzer's functionality is provided remotely, including the ability to monitor audio output from the analyzer, as well as transmitting from the analyzer using audio sent via the network connection from the user's office PC.

First, the analyzer display is distributed using a commercial

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TESSCO Offers Hands-On Training Classes and Seminars

Educating Technicians and Engineers As a supplier of emerging technologies solutions and test equipment required for today's evolving wireless applications, TESSCO provides a variety of training courses to keep you and your staff on the leading edge. TESSCO's training and certification programs are structured to deal with the real-life challenges you face every day. Step by step reviews of technologies enable new or experienced staff members to translate theory into practical, hands-on expertise. In just a few days, TESSCO's programs will help make you more effective by providing the knowledge and training you need to deploy and keep your wireless systems operational.

New! In-Building Coverage Certification Training

(Two-Day Course)

This training centers on the design and installation of signal booster systems for practical, real-world approaches to typical and highly specialized installations. Troubleshooting techniques and practices will allow field technicians to quickly identify critical system operating parameters for system optimization, and in the event of a component failure, rapidly identify and remedy those conditions to minimize system down time.

Topics include basic RF theory, FCC rules and regulations governing signal booster systems, typical applications, system design and optimization, equipment setup and use, and system maintenance.

Date	Location
December 6-7	Cleveland, OH

Alvarion Technical Training Class

(Three Day Course)

Customers will receive comprehensive, technical training on Alvarion's wireless access products. Alvarion application engineers will share with you the benefits of their knowledge and expertise. The theme for these three days of training will be metropolitan area deployment covering the following: an introduction to Alvarion, broadband wireless access system, wireless radio technologies, wireless access protocol, voice over IP, radio signal propagation, applications and network configurations, monitoring and configuration, and remote management.

Date	Location
November 9-11	Hunt Valley, MD
December 7-9	Reno, NV

Specialized Anritsu Site Master Line Sweep Training

(Two-Day Course)

This intense course, led by Anritsu's factory-certified instructors, focuses on RF line sweep theory and technology. Approximately 50 percent of the course is hands-on training. You will fine tune the skills and techniques required to install, maintain and troubleshoot your RF cable systems. Our goal is to improve your knowledge so you can keep your communications systems on-line longer and resolve cable, connector and antenna problems more efficiently.

Date	Location
October 26-27	Miami, FL
November 9-10	Reno, NV
November 16-17	Dallas, TX
December 7-8	Hunt Valley, MD
December 14-15	Chicago, IL

Cellular Radio Systems Fundamentals

(Three-Day Course)

New and experienced employees who maintain cellular-based and microwave-radio systems will benefit from this course, which covers core competencies and supporting technologies. Each module includes student exercises and applicable testing applications designed to strengthen job skills.

Modules include an overview of radio service as a transmission media, how transmitters and receivers work, modulation schemes used in cellular and PCS services, and an overview of wave propagation and radio-antenna systems.

Date	Location
October 19-21	Hunt Valley, MD

Grounding and Protection of Communications Sites

(One-Day Course)

Eight (8) BICSI Continuing Educations Credits

This course has been specially designed for the communications professional whose job responsibilities include working with AC and DC power systems. These session topics are tailored specifically to the distinct requirements of the communications industry. The sessions cover grounding basics, the grounding electrode system site grounding, grounding for equipment and enclosures, DC systems and signal-carrying cables, as well as an introduction to surge protection devices.

Date	Location
November 16	Corpus Christi, TX
December 2	Boston, MA
December 7	Atlanta, GA
January 11	Clearwater, FL

Motorola Canopy™ Advanced Technical Training Course

(Two-Day Course)

Hosted by TESSCO Technologies, Motorola Canopy advanced technical training is a comprehensive, instructor-led training that addresses detailed technical product hardware and software issues. It is recommended, but not required, that all attendees have a basic understanding of both Internet protocol (IP) and radio frequency (RF) technologies. Topics will include a Motorola Canopy system overview, designing a Canopy network, Canopy cables, connections and software, IP and Canopy, RF theory, Canopy system specifics, Canopy and simple network management protocol (SNMP), and supporting and maintaining canopy products.

Date	Location
October 12-13	Hunt Valley, MD

New! Certified RF Fundamentals and Power Measurement Training

(Two-Day Course)

In this course sponsored by Bird Technologies, engineers and technicians will learn the proper methods of calibration and measurement procedures using test equipment designed for Cellular, PCS and 3G, wireless LANs, GPS navigation systems, and DBS TV. Test equipment will be explained and demonstrated, including vector network analyzers, spectrum analyzers, frequency and time domain reflectometers, digitally modulated signal generators and vector signal analyzers.

The course is offered as a two or four-day class. The first two dates will cover the basics of RF power measurement, with the second two dates being the continuation of the class covering more advanced concepts of RF transmission system measurements. Prerequisites include a background in RF concepts with one year of practical experience. A hand-held scientific calculator is required during the course.

Date	Location
November 8-9	Cleveland, OH
November 10-11	Cleveland, OH

T1/DS1 Testing Concepts

(Two-Day Course)

The majority of wireless companies use DS1/T1 transport systems to connect their sites. Many times the wireless technicians are at the mercy of the provider when one of these connections is down. This course will focus on how to set up, operate and interpret results on standard DS1/T1 test equipment, efficiently install and test new DS1/T1 transport systems, troubleshoot existing DS1/T1 systems and equipment, perform channel testing on existing systems and much more. You are not required to bring your own test equipment; however, students are allowed to bring their own instruments and learn on the actual equipment they will be using in the field.

Date	Location
November 2-3	Reno, NV
December 7-8	Hunt Valley, MD

Selling Wireless Data Services

(One-Day Course)

This is a perfect course for new salespeople or management staff. Many wireless sales representatives have a difficult time up-selling their customers into additional wireless data services beyond voice. This course helps create an understanding of and a value proposition for additional wireless services like text messaging and BREW applications, among others.

It provides in-depth and easy-to-understand information on how to sell basic and advanced wireless services. An overview of all key technologies and applications ranges from basic cellular voice services to advanced wireless data services. Several key applications are demonstrated and students get hands-on experience with applications such as BREW, e-mail, ringtones and text messaging.

Date	Location
October 26	Hunt Valley, MD
October 27	Hunt Valley, MD

Fundamentals of Wireless Local Area Networks (Wi-Fi)

(Two-Day Course)

Wireless local area networks (WLANs) have become extremely popular in the last few years and the 802.11 technologies continue to explode. With wireless networks being set up in homes and businesses all over the world it is important for both wireless and wireline personnel to be comfortable with installation and troubleshooting of the variety of WLAN technologies and products.

Whether you're setting up HotSpots for your local coffee shop, configuring a home or small office WLAN, or helping an airport provide Wi-Fi connectivity to travelers, the skills obtained during this course will make these implementations seamless and trouble-free. A large portion of the course is hands-on and the attendee will be working with the more common hardware and software used today in WLAN implementations.

Date	Location
October 19-20	Reno, NV

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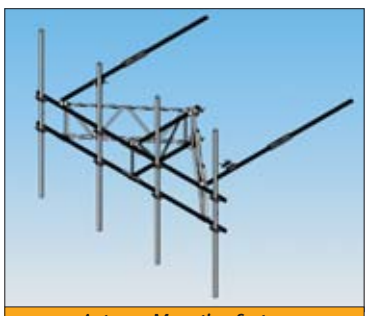
Are Your Towers and Your Installers Stretched to the Limit?

Aluma-Form antenna mounts weigh 65 percent less than their steel counterparts and still maintain the same strength and integrity. The use of 6061-T6 aluminum allows Aluma-Form antenna mounts to withstand wind speeds in excess of 100 miles per hour and maintain man loads of over 750 pounds. Aluminum is naturally resistant to corrosion and may be left unpainted. Aluma-Form antenna mounts are also compatible with steel towers because of the insignificant galvanic action between the two materials.

Aluma-Form antenna mounts also offer a huge advantage to the installer because of the small amount of labor required to assemble and hang them. These mounts ship almost 80-percent assembled and require as little as



Antenna Mounting System

10 minutes to assemble in the field. The combination of factory preassembly and extreme light weights gives Aluma-Form antenna mounts the edge when it comes to fast installations.

Aluma-Form mounting systems may be used on almost any pole or tower configuration. Adapters are available for mounting almost any antenna-mount configuration to angled tower legs, pipes or even large concrete and steel poles using the patented Bolt-A-Band product. Whether it is a sector frame for a self-supporting tower or a co-location platform for a monopole, Aluma-Form has a mount to fit your needs.

The lightweight nature of aluminum makes it an ideal choice for co-location applications or for reducing weight on overloaded poles and towers. The use of 6061-T6 aluminum and the latest technology for design, such as Finite Element Analysis and 3D Solid Modeling CAD Systems, allows Aluma-Form to design mounts that will fully support any application.

Aluma-Form sector frames come in 10-, 12-, 14- and 16-foot faces. *Visit TESSCO.com or call 800-472-7373 for more information.*

Factory-Fit Jumpers Feature Unique DIN Connector

Radio Frequency Systems' new CELLFLEX® factory-fit jumpers feature unique soldered-on 7-16 DIN male connectors for use in today's high-performance wireless systems. The connector design and manufacturing process has been optimized to produce premium VSWR and PIM levels for wireless telecom systems.

The jumpers are available in standard and premium styles with 1/2-inch standard (LCF12) or 1/2-inch superflexible (SCF12) foam-dielectric coaxial cable in 3-, 6-, 8-, 12- and 15-foot lengths. Mated or unmated, the jumpers are totally waterproof to IP68 and include heavy-duty strain relief sealing boots.

The jumpers are 100-percent PIM, VSWR and interface dimension-tested, and demonstrate a low IM, typically –155 dBc or better, with guaranteed maximum VSWR of 1.065:1 (-30.0 dB) at 806-960 and 1850-1990 MHz for premium jumpers and 1.105:1 (-26.0 dB) at 806-960 and 1850-1990 MHz for standard jumpers. *Visit TESSCO.com or call 800-472-7373 for more information.*

Factory-Fit Jumpers

Reliable FM-Approved Solar Modules

SunWize solar modules provide power for a variety of distributed instrumentation and communication loads in remote locations. They feature the following:

- Models from 5 to 40 watts
- Highly reliable power
- Easy installation
- Rugged, long life
- Factory Mutual approved, Class 1, Division II, Groups A-D
- CSA and IEC approved
- 20-year limited warranty

SunWize modules are also available in pre-assembled kits in order to save design and specification time. The kits include a SunWize SWIL-6 encapsulated regulator mounted inside the module junction box as well as an in-line fuse, a side-of-pole adjustable mounting structure and a prestripped output cable. The kit is ready for installation in the field in minutes and only requires attachment to a battery to make it a complete solar

5- to 40-Watt Solar Modules

power system. The kits are an easy, cost-effective way to source a complete power supply for any small equipment load located in a remote area that has no ready access to commercial power.

All SunWize modules are in stock and ready to ship. *Contact your TESSCO representative at 800-472-7373 for assistance in selecting the optimum SunWize module or kit for your application. Ask about SunWize Power Ready Systems—integrated, solar-electric power units using SunWize modules.*

Antenna Solutions for Expanded 700 MHz Public Safety Spectrum

System integrators, municipalities and government agencies migrating to the new 700 MHz frequencies can now rely on **Astron Wireless** to provide their antenna solutions. Astron offers both omnidirectional and yagi antennas for the 700 MHz band. Omnis are offered in unity and 3dBd gain models and directional antennas are available in a variety of gain applications from 7 to 12 dB.

In addition, the new 700 MHz line comes fully equipped with the standard features of Astron's popular 800 and 900 MHz

10-Element Yagi Antenna

antenna line, including an EverSealed balanced feed system, 3/4-inch boom materials, mounting hardware and a one-foot pigtail for quick and easy installation. The new 700 MHz directional antennas are also available in the popular ESP version that guarantees the antenna for 10 years.

Visit TESSCO.com or call 800-472-7373 for more information.

Grow Your Customer Base with Wireless ISP Marketing Kit

Growing your customer base is intrinsic to growing your business. And, your competition is filling mailboxes everywhere trying to build market share and mind share for the same type of services that you offer.

Think you can't market against them without deep corporate pockets? You can!

You know your market, you know your community and you probably know many of your potential customers. With the right tools and resources you can market your business effectively and grow your subscriber base.

Motorola Canopy is pleased to offer you their wireless ISP marketing kit designed to extend your customer base and market reach. The kit contains a series of marketing tools that range from demos ideas to direct mail to advertising—all designed to get the attention of your potential residential or business broadband customers. And, Motorola Canopy has provided a step-by-step process that walks you through each marketing opportunity and outlines the investment in time, resources and dollars to implement these programs.

If you are currently an authorized Canopy reseller, go to *http://motorola.canopywireless.com/channel* and login to the Channel Member Web site. There will be a link to the marketing kit in the main menu. Click on Lost Password if you can't remember your login.

Interested in Partnering with TESSCO as an Authorized Canopy Reseller?

Two levels of participation are available through TESSCO: Authorized Canopy Solutions Providers (ACSP) and Authorized Canopy Resellers (ACR). Apply today by completing the online form at *http://products.adtrack.com/00383/cppafTESSCO.html or by calling toll free at 866-817-5369. TESSCO carries the full line of Canopy products from access* points to subscriber modules to accessories.

Want to reach 100,000 wireless professionals with your product and brand message?

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Product information and performance claims are provided by manufacturers.

Product Launches and Milestones Recently Set for Wireless Broadband

On August, **Alvarion, Inc.**, the North American subsidiary of Alvarion, released the BreezeACCESS SU-M mobile subscriber unit for 900 MHz. The SU-M mobile solution for 900 MHz features large radio cells that allow cost-effective, ubiquitous coverage of vast areas. As few as three access units can cover 50 square miles, many times fewer than the number needed in a mesh configuration. The solution enables public safety organizations, transit entities, government and utility organizations, EMS, and military agencies to stay connected with vehicles on the move throughout entire cities. The subscriber supports eight MAC addresses and up to 3 Mbps per terminal, more than sufficient to support simultaneous VoIP, real-time video and data applications, including RMS, mug shots, fingerprints, warrant requests and vehicle/DMV data.

In July, Alvarion released firmware version 2.0 and a new subscriber for BreezeACCESS VL, the world's most deployed non-line-of-sight (NLOS)-capable multipoint orthogonal frequency division multiplexing (OFDM) solution for the unlicensed bands, including significant deployments by such carriers as British Telecom. Free and backward compatible, the new firmware provides up to 21 Mbps net Ethernet throughput per sector, greatly increasing the number of subscribers per cell. While already extremely secure via included AES, MAC denial lists ability has also been added. And to better make the business case, a 3 Mbps subscriber has been added to expand the options to include 3, 6, and 24 Mbps CPE options.

Wireless Broadband Solutions

Also, in a milestone for the industry, Alvarion released its BreezeMAX WiMAX-ready solution. Compliant with both 802.16 and ETSI HiperMAN standards, BreezeMAX is built from the ground up to support the emerging worldwide interoperability for microwave access (WiMAX) market, BreezeMAX is the most advanced wireless platform in the world, offering efficiency of about 4 Mbps per megahertz (about eight times more efficient than Wi-Fi) and a wide variety of customer premise equipment (CPE), including models with multiple voice ports with built-in Session Initiation Protocal (SIP) and models with integrated 802.11g for wireless extension within the enterprise. Available first for the 3.5 GHz bands (not available in the U.S.), BreezeMAX will extend to a variety of licensed and unlicensed frequencies in 2005. BreezeMAX is already being deployed by a select group of major international carriers, with full commercial release slated for Q3 2004.

Finally, in June Alvarion crossed the 2,000,000 deployed-unit threshold, validating for the entire market that even in these pre-WiMAX days, wireless broadband is thriving. *Visit TESSCO.com or call 800-472-7373 for more information.*

PolyPhaser
CORPORATION
Global Lightning Solutions...
Protection for Broadband Wireless Access:
AL-LSXM:
Coaxial Protection from 2.0 to 6.0 GHz
For less exposed subscriber units
Non dc-pass applications
Fully weatherized
Connectors: N and TNC
(Reverse Polarity)
IX series:
Modular data and/or
dc protection for twisted pair
Cat5 Compatible (up to 100Mbps)
RS232, T1/E1, RS422, RS485
Available in various configurations
Indoor and Outdoor models available
3G and Next-Generation Solutions
for the Communications Industry
SXL Series is capable of passing high RF power (up to 1kW) with low loss (<0.1 dB) and very low PIM (<-154 dBc) in Cellular, PCS and UMTS applications by limiting surge voltage to <+/- 3V and typical energy let through in the pico Joules. The broadband nature of the series also allows the use of a single product across several applications.
HF Series protects multiple combined or single high power RF transmitter where dc voltage is not required.
GX Series/Bias-T Series has been designed for sensitive Tower Top Electronics (TTE), Tower Mounted Amplifiers (TMA) or active antennas (i.e. GPS) where dc voltages are required. Broadband high power Bias-T using dc block technology in the RF path with solid-state filter for the dc pass/injection. Designs available for AISG telemetry for remotely controlled antennas.
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TESSCO Outlet enables you to take advantage of special pricing on selected items. Visit us online at www.tessco.com/go/outlet.

Boosting SCADA and Telemetry Performance Through Antenna Technology

When selecting antennas for SCADA applications, it is not unusual for operators to use lower-cost antenna equipment and replace it as it deteriorates. For remote applications where climatic or environmental conditions can be particularly harsh, antenna systems are viewed as disposable items, since the cost of replacement is usually less than the cost of servicing.

The key to more efficient SCADA communications over wireless is finding ways to increase mean time between failures (MTBF), a task that can be achieved through more careful selection of antenna equipment. More advanced antenna designs today offer a number of features that not only improve the electrical performance, but also significantly increase the durability and lifespan of the equipment.

Coatings

Sinclair Technologies manufactures yagi antennas with aluminum. However, challenging environments can accelerate pitting and corrosion of these types of antennas, leading to rapid deterioration and non-performance within two years. To prevent this from occurring, Sinclair uses an anodized coating.

Anodized coatings offer thicker, harder films because it is an electrochemical process. In addition, black anodized coatings are preferred for northern climates because the dark slippery coating prevents ice from forming and accelerates ice melting.

Other Considerations

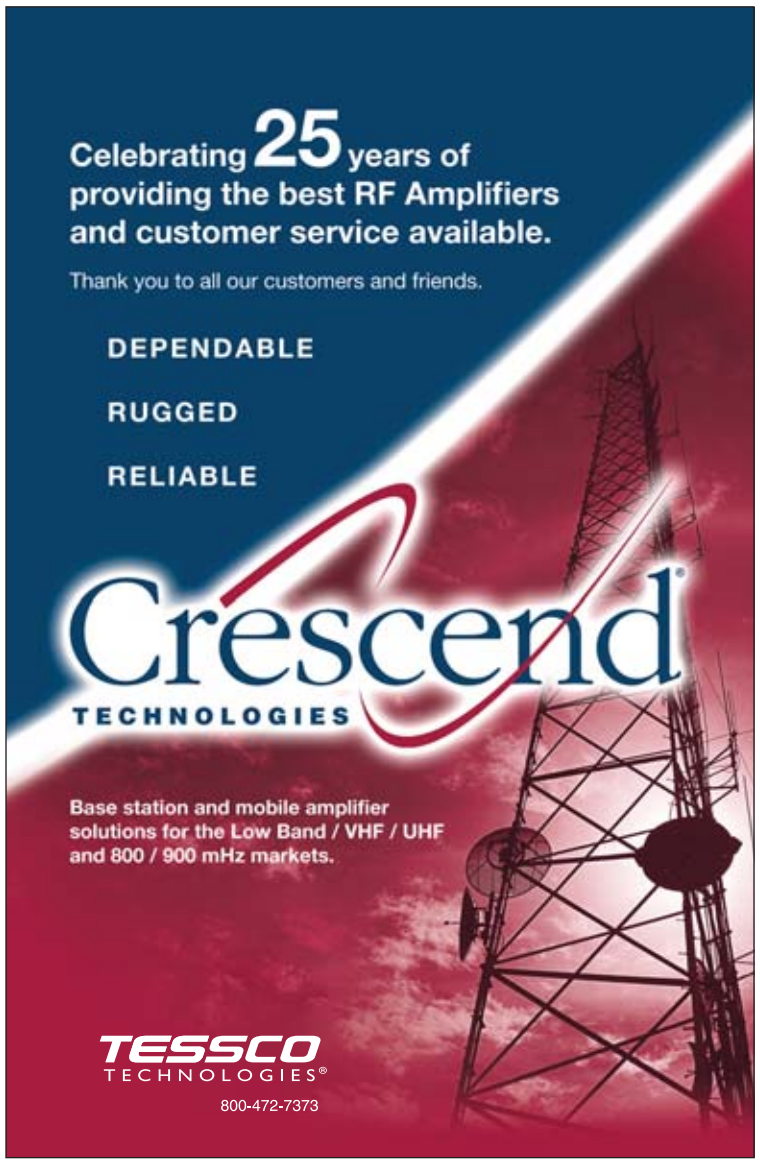
In addition to coatings, Sinclair pays careful attention in choosing the correct cable and connectors. In SCADA applications, the cable for the antenna assembly should match the life expectancy of the antenna boom. Hence, UV-resistant jacketed low -loss foam helix cables are used for harsh environments.

Sinclair also minimizes the number of joints to reduce MTBF. Joints are soldered, brazed or welded using non-corrosive flux, and spring finger or crimp joints are not used.

Black Yagi Antenna

The Growing World of Wireless

Not only does wireless improve capabilities for remote monitoring and control at less cost, it also delivers unprecedented flexibility for central operations. At the same time, initial cost savings are only beneficial if the technology has the longevity to increase MTBF over the longer term. By choosing Sinclair antennas to make the proper investment up front in the critical components of a wireless network, the return on investment can be considerable. *Visit TESSCO.com or call 800-472-7373 for more information.*



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*For your current pricing and our complete product offering, visit TESSCO.com or call TESSCO.

No-Solder Connectors for LMR-240

Times Microwave Systems announces the availability of the EZ-240-SM and EZ-240-SM-RA connectors for LMR-240 low-loss coaxial cable. These straight and right angle SMA plugs attach to the cable without soldering, making them ideal for field installation. The center contact attaches to the center conductor of the cable via beryllium copper spring fingers and the outer contact is made via a crimp onto the outer braid of the cable. Each connector is individually packaged with installation instructions and dual-wall, adhesive-lined shrink tubing for strain relief and weather protection.

SMA Connectors for LMR Cable

TESSCO Part No. 411610
Straight SMA Plug
List: $8.00 Bronze: 6.00

TESSCO Part No. 489611
Right-Angle SMA Plug
List: $15.00 Bronze: 11.25

Also available are QMA EZ no-solder connectors for LMR-240 low-loss coaxial cables in both a straight version as well as a right-angle configuration.

QMA EZ Connectors

TESSCO Part No. 460625
Straight QMA EZ Connector
List: $10.00 Bronze: 7.50

TESSCO Part No. 462657
Right-Angle QMA EZ Connector
List: $16.00 Bronze: 12.00

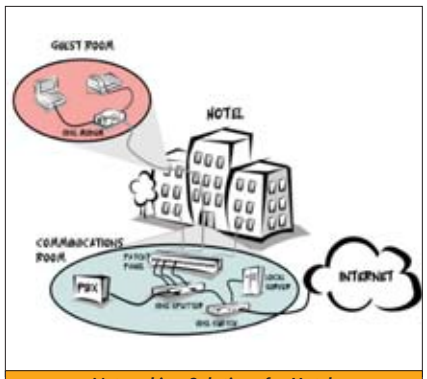
LMR® cables are flexible, non-kinking, low-loss RF transmission line cables that utilize easy-to-install connectors and are suitable for use as antenna feeders, system jumpers and interconnects. *Visit TESSCO.com or call 800-472-7373 for more information on Times Microwave Systems high-performance coaxial cables and RF transmission line.*

Broadband Solutions Using VDSL Technology

How can hospitality facilities such as hotels and cruise ships offer a broadband Internet connection to its guests without major rewiring costs?

The answer is a new technology called very high data rate digital subscriber line (VDSL). VDSL is a high-speed broadband technology that offers high-speed performance over existing telephone wiring. VDSL allows you to share an Internet connection amongst guests or tenants, as if they each had their own separate broadband connection.

All types of DSL technologies operate over the existing copper telephone cabling. They use higher frequencies over the copper wire to introduce data signals without interfering with the lower frequency voice signal. The speed achievable is dependent upon the distance from the local exchanges and the quality of the copper wiring. This is why



Networking Solutions for Hotels

the availability of asymmetric DSL for telephone subscribers is dependent upon how far away they are from the local telephone exchange. But VDSL does not have these restrictions. Since it operates only over the in-building wiring, it is not limited by distance as long as the wiring does not extend more than 1.5 kilometers.

SMC Networks has what you need to install VDSL in an existing building:

- *SMC7724M/VSW VDSL Switch*—connects local and remote data devices to the internal VDSL network.
- *SMC7024/7048/VSP VDSL Splitters*—combine voice and data streams over existing telephone wiring systems.
- *SMC 7500A VDSL Modem*—used to split out the voice and data signals from the combined VDSL signal at the customer's premise in their room or office.

TESSCO has these SMC Networks products in stock. *Visit TESSCO.com or call 800-472-7373 for more information.*

TESSCO Part No. 483690
VDSL Switch
List: $3,460.00 Bronze: 3,114.00

TESSCO Part No. 497618
VDSL 24-Port Splitter
List: $545.00 Bronze: 490.50

TESSCO Part No. 444163
VDSL Modem
List: $125.00 Bronze: 125.50

Sector Panel Antennas for Wi-Fi and WiMAX WIPOP Applications

This new line of directional, high-performance **MAXRAD** sector panel antennas establishes a new price/performance standard for wireless Internet point-of-presence (WIPOP) network sites. Competitively priced for Internet Service Provider (ISPs) and network installer customers, these sector panel antennas offer electrical and mechanical features at price points unavailable in today's market. They operate within the Wi-Fi and WiMAX unlicensed bands, and are designed to address specific physical and electrical requirements to ensure optimal wireless coverage in WIPOP installations.

One model—the MSB2401690 shaped beam sector panel antenna—utilizes pattern-shaping technology to allow contoured coverage and optimal signal performance within the desired propagation area. The shaped beam sector panel antenna covers frequencies from 2.4 GHz to 2.5 GHz with 16 dBi gain and outstanding front-to-back ratio of more than 28 dB.

Also new, the WISP24017MBH is a 2.4 GHz horizontally polarized sector panel antenna that offers user-selectable horizontal beamwidth options of 45, 60, 90 or 120 degrees, and up to 17 dBi gain performance in a compact, UV-resistant housing. Its front-to-back ratio of over 30 dB at 120, 90 or 60 degrees, and over 26 dB at

Shaped-Beam Sector Panel Antenna

45 degrees ensures that the radiated energy is targeted towards the area of coverage, while a typical cross-polarization discrimination of over 26 dB ensures minimum interference from neighboring vertically polarized antennas.

In addition, two new models covering 2700 MHz to 2900 MHz frequencies are being introduced. The WISP28016MBH horizontally polarized, and WISP28016MBV vertically polarized sector antennas provide user-adjustable horizontal beamwidth options of 90 or 60 degrees, with a front-to-back ratio of >25 dB in the horizontally polarized model, and over 35 dB in the vertically polarized model. These antennas feature typical cross-polarization discrimination of over 20 dB or better in high RF traffic areas, with a gain performance of 14 dBi at 90 degrees, and 16 dBi at 60 degrees. To complement the line, a new wideband adjustable sector panel antenna, covering 4.9 GHz to 6 GHz frequencies will soon be available for use in applications within the Wi-Fi, WiMAX and public safety bands at 4.9 GHz. *Visit TESSCO.com or call 800-472-7373 for more information.*

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"EZ" Non-solder Connectors

Easy Installation Tools

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- LMR-DB Watertight Cable
- LMR-Ultraflex Cable
- LMR-FR Fire Retardant Cable
- LMR-LLPL Plenum Cable

Field Training and Technical Seminars

Jumpers and Cable Assemblies

Grounding Kits and Installation Accessories

Let Times Put All the Pieces Together For You!

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TIMES MICROWAVE SYSTEMS A Smiths Group plc company

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Turn your last mile into your most profitable mile.

Tsunami™ MP.11a offers service providers the most economical point-to-multipoint solution on the market.

It's still a land grab for service providers—whether you are a traditional wired ISP or a WISP. The faster and cheaper you can build out your network, the more business you can go after. And nothing lets service providers do this better than theTsunami MP.11a from Proxim. Capable of transmitting greater than 20 Mbps or distances up to 11 miles away, the Tsunami MP.11a lets you scale quickly and offer economical residential solutions that can compete with DSL and cable. The solution is self-installable and provides remote management capabilities to keep your deployment and maintenance costs at a minimum. It also features a Radius client that lets you offer multiple service options to business and residential customers. Tsunami is so cost-effective that many businesses are already using it to replace leased lines between buildings, network whole campuses, and even deploy outdoor surveillance systems. To learn more, go to www.tessco.com/go/proxim or call 800-472-7373.

TESSCO TECHNOLOGIES®

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proxim WIRELESS NETWORKS

Extend the 5.8 GHz Range with Higher Data Rates and More RF Power

With data rates up to 72Mbps, the **Solectek** SkyWay 5000 delivers more data capacity per sector than ever before, extending 5.8 GHz range. Users can now download large data files, high-resolution images, video clips, and MP3 files within a matter of seconds. Even streaming multimedia can now be delivered seamlessly.

The introduction of Orthogonal Frequency Division Multiplexing (OFDM) technology brings increased spectral frequency and higher data rates while providing multiple, nonoverlapping channels. Many users will find that OFDM is capable of performing near or non-line-of-sight (NLOS) links. OFDM is also much more immune to multipath problems and resistant to potential interference.

The SkyWay 5000 Series is fully integrated: digital baseband, radio and antenna are all combined into a single, weatherized outdoor chassis, complete with Power over Ethernet (PoE) support. This product can be installed at any convenient outdoor location without worrying about cabling difficulties. Inexpensive Ethernet CAT5 (up to 300 feet) is all that is required for connecting your indoor network switch. Full-function bridge/router software and extensive network protocol and network management support are included. *Visit TESSCO.com or call 800-472-7373 for more information.*

SkyWay 5000 Series

Power Protection Solutions for Broadband Applications

Tripp Lite offers three new economically priced, premium-featured UPS systems for the installer of wireless broadband solutions, including telco interface, wireless voice, data network, point-to-point and in-building applications.

The SmartPro 1050SLT (TESSCO Part No. 472629), SmartPro 1500SLT (TESSCO Part No. 46410) and SmartPro 750XL (TESSCO Part No. 421538) are microprocessor-controlled, line-interactive UPS systems that feature pure sine wave output. Other shared features include an SNMP slot and two communication ports that work with Tripp Lite's award-winning PowerAlert software for complete network power management and control. The SmartPro1050SLT and 1500SLT models feature advanced automatic voltage regulation, plus up to 18 minutes of battery runtime at half-load. The SmartPro 750XL offers expandable runtime capability with additional external battery packs.

These UPS systems include $250,000 Ultimate Lifetime Insurance, plus a two-year product warranty, with optional three- and five-year extended warranties available. *Visit TESSCO.com or call 800-472-7373 for more information.*

SmartPro 1500SLT UPS System

TESSCO Part No. 472629
Smart Tower UPS/1050 VA
List: $499.00 Bronze: 384.23

TESSCO Part No. 464610
Smart Tower UPS/1500 VA
List: $599.00 Bronze: 464.23

TESSCO Part No. 421538
Smart UPS 600 Watts/750 VA
List: $471.00 Bronze: 362.67

Want to reach 100,000 wireless professionals with your product and brand message?

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Simplifying BOA Installations

Built-in test equipment (BITE) has long been an integral part of many electronic systems and **CSI** has now introduced this concept into in-building systems.

Proper installation of an in-building amplifier requires that the installer bring to the site additional equipment such as a spectrum analyzer, power meter, or laptop computer, along with the cables necessary to connect them. The new LCD two-line by 16-character alphanumeric readout display and navigation pushbuttons on the models 510, 510-75 and 610 provide many key system benefits. Now, by using this simple, intuitive interface, the installation technician can observe uplink and downlink power and AGC activity, reducing the need for additional equipment. Amplifier gain is set by simply navigating through the menus and directly setting the gain desired—no more error-prone calculation of attenuation values.

New LCD Readout Display

System troubleshooting is also greatly enhanced by this capability. Power and AGC levels can be compared to identify system changes. Accurate measurements can even be obtained from nontechnical staff at the end-user's site, minimizing unnecessary site visits. To help the installer ensure a successful installation, these models also incorporate an oscillation detection and suppression feature. *Visit TESSCO.com or call 800-472-7373 for more information.*

Defeating NLOS

(continued from page 1)

multi-output (MIMO) radio systems are able to asses the real time channel conditions and adjust how data is sent to multiple transmit antennas and how best to extract symbols from multiple receive antennas. Progress in this area is rapid, but the complexity of multi radio designs prevents such an approach from being cost-effective today.

It has been demonstrated that a high-power OFDM radio is able to open many more potential client sites as compared to older technology with little to no cost penalty. The wideband OFDM engine provides all of the benefits described previously, including tolerance of multipath fades, elimination of delay spread and Doppler effects. A 400 mW RF stage creates the link gain to work through many instances of shadowing effects and absorption through obstructions.

For more information on high-power OFDM radios, please see the Solectek advertisement on this page.

Product information and performance claims are provided by manufacturers.

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Permanent Exothermic Welding System Will Never Corrode or Loosen

The ability of a grounding system to protect property and personnel is dependent upon the quality and effectiveness of the connections used to form the ground circuit. That is why the **Harger** Ultraweld® exothermic welding system is the preferred method for making electrical grounding connections for all the types of conductors and electrodes used in today's modern grounding systems. While many grounding connection methods, including compression, bolted, brazed and welded, will perform well for the first few years, only the molecular bond provided by the Ultraweld exothermic welding system is permanent and proven to work better than typical connectors providing only point-to-point contact. Ultraweld exothermic connections are more conductive, more durable and cannot loosen. That is why exothermic connections are the premier standard connection chosen by engineers for utility substations, transmission and distribution systems, lightning protection and telecommunication system grounds. Ultraweld exothermic connections are UL listed (Standard 467—Grounding and Bonding Equipment).

Effective and Safe

The Ultraweld exothermic welding process is an effective and safe method of welding copper to copper or copper to steel for the purpose of producing permanent electrical connections. The exothermic chemical reaction takes place at a temperature of approximately 4,600 degrees Fahrenheit and, as a result, molten copper alloy is produced and used to melt the conductors and cast the finished connection. The exothermic reaction takes place in a semipermanent graphite mold that will last 50 or more welds if cared for properly. Molds contain a reaction chamber and weld cavity for the specific conductors and the arrangement of the connection required. The graphite molds have permanent markings indicating the mold part number, the type and size of weld metal, and the type and size of conductors that are to be welded. Instructions detailing general safety information, connection preparation and welding procedures are provided with each mold. Ultraweld weld metal is packaged in containers that are resistant to moisture, damage or spillage during shipping. Ultraweld starting material does not contain phosphorous or any caustic, toxic or explosive substances.

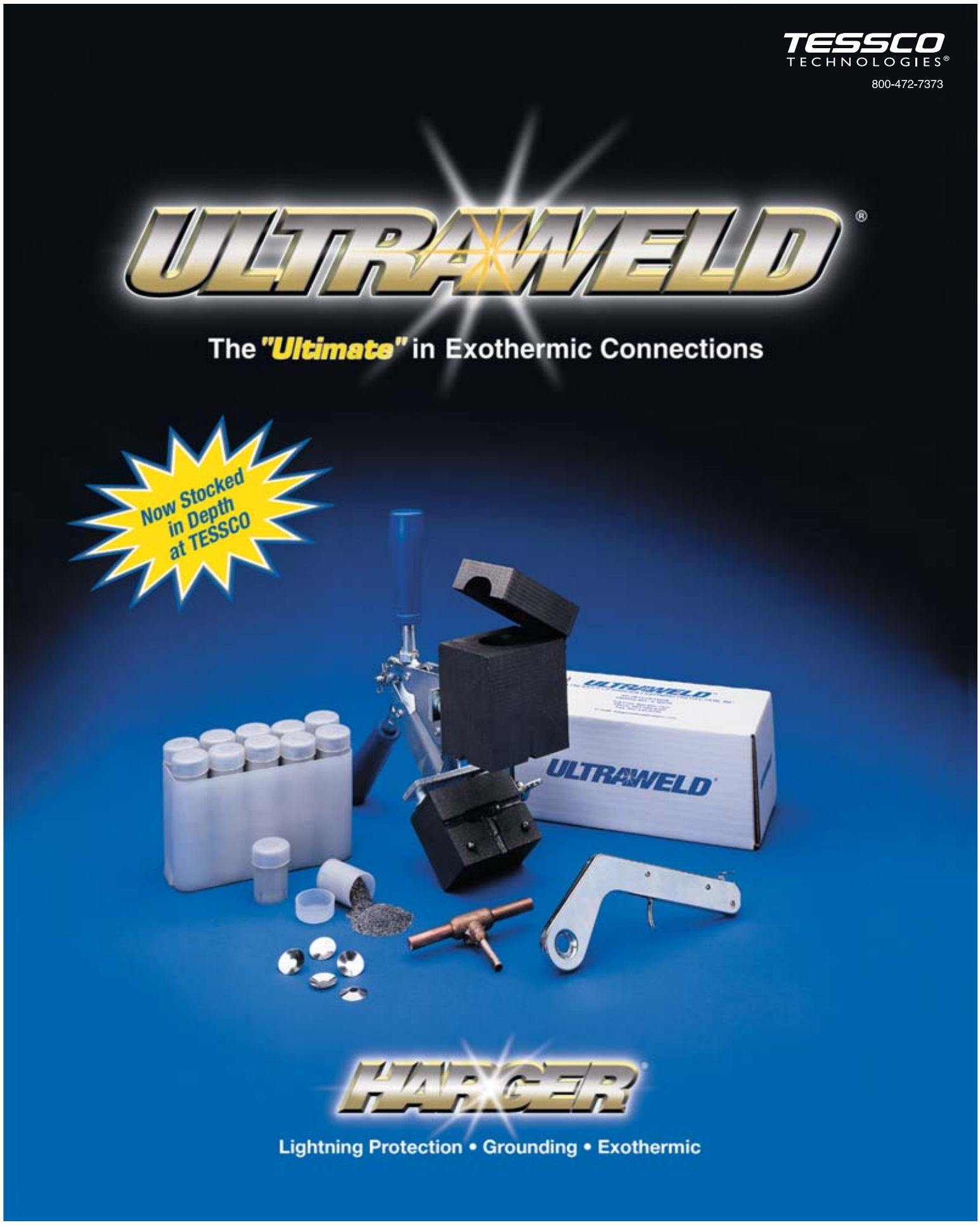
Easy to Implement

Ultraweld is a simple and easy to use process that provides an on-site method for making welded electrical connections without requiring external power, welding machine or special training. The Ultraweld exothermic welding system uses lightweight, inexpensive equipment that can be used to join a variety of different metals, including copper conductors, steel-cored ground rods, galvanized steel fence posts and tower members, ductile and cast iron, and stainless steel. The process provides a finished connection that will never corrode, loosen or increase in resistance. The finished connection also provides an ampacity that exceeds that of the conductors being joined and the quality is verified simply by visual inspection.

Intuitive Part Numbering System

The Ultraweld exothermic welding system has the industry's easiest and most intuitive mold part-numbering system. Ultraweld mold part numbers provide information on the connection type, conductor size(s) and the mold price key. With the Ultraweld system, there is no need for cumbersome conductor codes. For example, the part number for a mold that welds a 4/0 wire over the top of a 5/8-inch ground rod is GO584/0B. In this example the price key is "B," which is the most common price key for molds used for electrical grounding connections. The price key is used to simplify pricing and indicates the type of the handle clamp required to actuate the mold.

The Ultraweld line also includes Uni-shot molds, an alternative disposable (single-use) mold that provides convenience when only a few connections are required. The Uni-shot system is available for select cable-to-cable and cable-to-ground rod connection configurations. Finally, a smokeless line of Ultraweld products that is available for indoor use and confined spaces. *Visit TESSCO.com or call 800-472-7373 for more information.*



Product information and performance claims are provided by manufacturers.

Ethernet Bridge Delivers Reliable, Low-Cost Broadband Wireless Connections

Because **Orthogon Systems** offers the only true non-line-of-sight (NLOS) solution in the market, they're known for their ability to solve the tough environmental radio challenges. However, the same compact OS-Gemini products outperform the competition in near-line-of-sight (nLOS) and line-of-sight (LOS) environments as well, providing additional opportunities:

- Make the most efficient use of the spectrum with OS-Gemini's narrow 12 MHz channel.
- Deliver secure broadband connections over challenging radio paths.
- Decrease the transient fading and dispersion that degrades all wireless signals. Engineer the link to deliver carrier-class availability (99.999-percent availability or higher).
- Improve performance over water and flat terrain where other systems often struggle.
- Improve backhaul traffic and last-mile access.
- Transport data interference-free even in adverse weather conditions.

OS-Gemini's unique multi-beam space-time coding technology transmits multiple signals carrying the same, but decorrelated, data streams that are recombined at the receiving end to deliver reliable, highly available broadband wireless communications for real-time, mission-critical applications. At power-up and during operation, OS-Gemini scans the whole band and automatically switches to the clearest channel. Its best-in-class radios utilize powerful transmitters with super-sensitive receivers to deliver a class-leading 167 dB system gain. Yet, with all its capabilities, OS-Gemini is cost-effective, easy to deploy and compatible with other equipment.

The OS-Gemini solution is perfect for ISPs, enterprises, government, education, healthcare and other markets requiring point-to-point applications. Customers can use Orthogon's online Link Estimator tool to determine whether or not the OS-Gemini can deliver the performance required in the specific environment.

Visit TESSCO.com or call 800-472-7373 for more information.

TESSCO Part No. 471682
OS-Gemini Integrated
List: $11,995.00 Bronze: 11,395.25

TESSCO Part No. 469566
OS-Gemini Connectorized
List: $11,995.00 Bronze: 11,395.25

OS-Gemini (Integrated)

Service Providers: Orthogon Systems is providing a 30-day Try and Buy program as a limited-time offer for qualifying service providers.

Resellers: Orthogon Systems provides a Free Sales Express Kit, containing data sheets, a PowerPoint presentation and an e-mail message to customize and send to prospects—designed to help jump-start your sales effort.

Customer Success Story

DS-3 Communications deployed 18 links of Orthogon for a distance-learning project in Texas. Besides being a large deployment, this sale was noteworthy because:

- Only Orthogon was willing to provide the up-front engineering support and performance assurances the customer required.
- The system installed was for video transport over multiple wireless links… a hot application!
- The project required sustained throughputs above 24 Mbps in links spanning up to 30 miles, and in links without radio line of sight.
- The Orthogon-based solution almost paid for itself just in the savings in tower costs.
- The Orthogon units were deployed in a matter of hours.

Keep Orthogon in mind for your customers with long distance link requirements, mounting/equipment size constraints, and near or non line-of-sight considerations.

Power System Unveiled for Medium Power Applications

NEWMAR's new Centurion Rectifier System is designed to meet a wide variety of telecom, wireless and co-location site power requirements. The system is ideal for medium-power applications requiring redundancy, hot-swap capability and system scalability.

A single 2U shelf accepts (TESSCO Part No. 426692) up to three 550-watt, 12-, 24- or 48-volt rectifiers that slide and lock into place for a redundant system that is easily scaled to requirements. Rectifiers can be added or changed without system shutdown. The system may be used to power equipment directly or charge site batteries using three-stage, switch-mode technology, adaptable to many different types of battery chemistries.

System monitor features include bar graph output power display, LED status indicators, output voltage test points and adjustment pot, plus form A and form C alarm contacts. The system operates from a wide input range of 90-264 VAC, with .96 power factor correction. Units are designed to UL 1950 standards, with compliance testing in progress. *Visit TESSCO.com or call 800-472-7373 for more information.*

TESSCO Part No. 420663
Rectifier, 24 Volts DC, 20 Amp
List: $945.50 Bronze: 689.85

TESSCO Part No. 449629
Rectifier, 48 Volts DC, 10 Amp
List: $945.50 Bronze: 689.85

Centurion Rectifier System

Directional Site Antennas: In-Building or Outdoor

Mobile Mark offers corner reflector antennas for high-frequency applications at 2.4 GHz, 3.5 GHz, 5.2 and 5.8 GHz.

These antennas feature excellent bandwidth, gain and match. They offer efficient point-to-point signal transfer, and the broad beamwidth makes them easy to align. Directional antennas can also be useful for preventing cross-system interference with similar devices.

These compact site antennas, with a front aperture of only 3 inches by 5.5 inches, are easy to install. The female N connector exits from the back of the antenna for quick access. Mount hardware is provided to allow for either pole or surface mount. *Visit TESSCO.com or call 800-472-7373 for more information.*

Corner Reflector Antenna

TESSCO Part No. 20372
2300-2600 MHz Corner Reflector
List: 182.00 Bronze: 115.94

First Indoor and Outdoor Wi-Fi Base Stations

Vivato has invented the industry's first indoor and outdoor Wi-Fi base stations. This revolutionary Wi-Fi technology offers dramatic improvements in range and coverage—providing users significant cost savings over traditional solutions.

Vivato's cellular solution includes Wi-Fi base stations that provide up to 2.5 miles of wireless coverage outdoors, and micro and pico cells used to eliminate coverage gaps and increase bandwidth in high demand areas. The indoor product line uses the same cellular architecture to extend the Vivato cost and coverage advantages to indoor applications.

Vivato's base stations use phased-array smart antennas to create highly directed, narrow beams of transmission. The Wi-Fi beams, created on a packet-by-packet basis also reduce interference, since they are powered only when needed.

The cellular approach to Wi-Fi significantly simplifies Wi-Fi deployment. A single Vivato Wi-Fi base station takes the place of dozens of applications dramatically reducing deployment and maintenance costs. The result is unequaled performance and lowest total cost of ownership. *Visit TESSCO.com or call 800-472-7373 for more information.*

Indoor Base Station

TESSCO Part No. 415630
Indoor Base Station, 802.11b
List: $3,995.00

TESSCO Part No. 489656
Outdoor Base Station, 802.11b
List: $13,999.00

TESSCO Part No. 445607
Indoor Base Station, 802.11g
List: $5,995.00

Weatherproofing Reliability

Never use butyl and tape again to weatherproof your inline connectors, splices and ground kits. **EMI**'s inline connector covers are the ultimate way to have a clean, consistent, reliable weatherproofing seal. In addition, they assist in reducing vibrations that could loosen connections.

Installation time is a fraction of the time compared to butyl and tape. ICCs can be re-entered and resealed as many times as you need—no temperature or time limits.

Accept no alternatives! EMI also has solutions for weatherproofing shelters or cabinet entry systems. *Visit TESSCO.com or call 800-472-7373 for more information.*

Inline Connector Covers

Best Enclosure Protection for the Money

Bud's NEMA 4X plastic boxes provide a noncorrosive all-weather protection at a fraction of the price of comparably sized metal products. These molded enclosures also meet IEC52/IP65, UL508-4x specs. Ranging in sizes from 4 x 4 x 2 inches to 10 x 7 x 4 inches, they are a great approach for all of your rugged needs. Extra features include wall-mounting provisions for rapid installation without impacting the integrity of your equipment. All hardware is included, and the boxes have molded vertical card guides as well as mounting bases. The pre-installed neoprene gasket provides a turn-key assembly process. Boxes come with a light gray polycarbonate body and either a clear or light gray polycarbonate cover, all UV stabilized with an UL94-5VA flammability rating. *Visit TESSCO.com or call 800-472-7373 for more information.*

TESSCO Part No. 24094
10.43" x 7.28" x 3.74" NEMA Box
List: $32.55 Bronze: 28.22

TESSCO Part No. 21596
4.72" x 4.72" x 3.54" NEMA Box
List: $15.45 Bronze: 13.37

All-Weather Enclosure

Product information and performance claims are provided by manufacturers.

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*For your current pricing and our complete product offering, visit TESSCO.com or call TESSCO.

Bluetooth® Headset Offers the Ultimate Wireless Freedom—Now At an Affordable Price

Introducing **Plantronics** M2500 Bluetooth® wireless headset, a stylish headset that is perfect for the mobile professional or anyone on the go. The M2500 offers all the freedom of Bluetooth wireless technology combined with a comfortable, ergonomic design—all at an affordable price.

M2500 Bluetooth Headset

Lightweight and low profile, the M2500 offers a secure and balanced fit for maximum comfort. The SoundGuide™ earpiece fits comfortably in your ear and ensures maximum sound quality. The M2500 headset can be worn on either the right or left ear, as the SoundGuide earpiece will adjust for either ear. The omni-directional, short boom microphone delivers clear conversations. The M2500 headset features up to five hours of talk time or 120 hours of standby time.

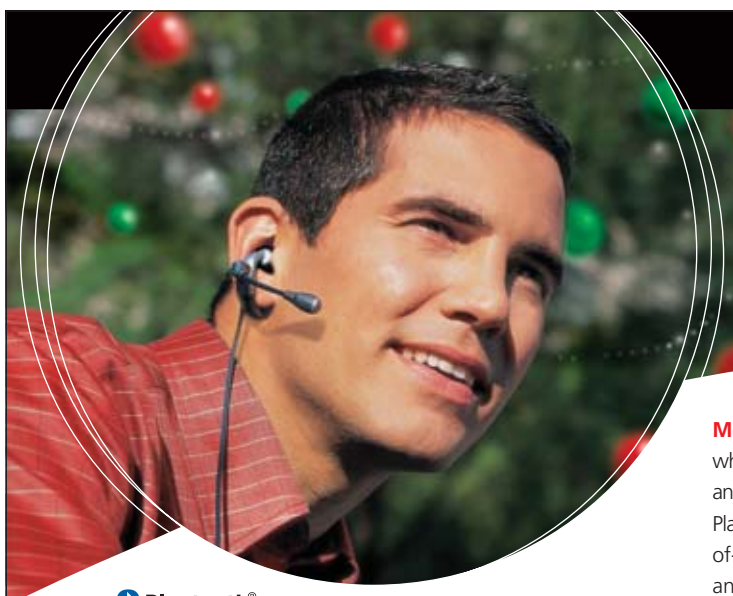
M2500: Up to 5 Hours Talk Time

The M2500 is easy to use, with intuitive controls for power, volume, mute, and call answer/end control. The easy on/off design allows you to put the headset on or take it off with one hand. Without wires to hold you back, the M2500 provides the freedom to go wherever your conversation takes you—up to 30 feet from your Bluetooth mobile phone or device. This headset supports Bluetooth headset and hands-free profiles for universal compatibility with most Bluetooth mobile phones, PDAs, computers, and more.

Plantronics M2500 Bluetooth headset is universally compatible with most wireless phones with built-in Bluetooth headset or hands-free functionality. *Visit TESSCO.com or call 800-472-7373 for more information regarding Bluetooth handset compatibility.*

M2500: Compatible with Most Bluetooth Devices

Plantronics M2500 headsets makes a great holiday gift so stock up today!



PLANTRONICS®

Plantronics headsets make the **perfect holiday gift–** with styles to fit every customer.

Mobile headsets maximize your comfort by freeing your hands for other tasks while you're on the go, in the office, or at home. Plantronics offers a headset design and style to fit every individual's needs—all with the quality and proven reliability Plantronics has been providing for over 40 years. These mobile headsets use state-of-the-art technology to offer unsurpassed comfort and performance. Try one, and free your hands today!

Bluetooth® Plantronics mobile headsets using Bluetooth® wireless technology

M3000
Ultimate Wireless Freedom
- Up to 8 hours of talk and up to 200 hours of standby time
- Supports Bluetooth® headset and hands-free profiles
- Up to 30-foot range between headset and Bluetooth® device
- Noise-canceling microphone for ultimate sound quality
- Intuitive controls for volume, mute, and call answer/end
- Reversible multiple-size earloops for comfortable fit on either ear

M2500
Designed for Comfort, Style and Mobility
- Stylish, ergonomic design for easy-to-wear comfort
- Supports Bluetooth® headset and hands-free profiles
- Up to 30-foot range between headset and Bluetooth® device
- Up to 5 hours talk time and up to 120 standby time
- Intuitive, easy-to-use controls for volume, mute, and call answer/end
- SoundGuide™ earpiece for maximum comfort and sound quality

MX150 Series
Flexible Fit and Superior Sound Quality

MX150, MX153-M1, MX153-N1, MX153-N3
- Flex Grip® design for exceptionally stable positioning
- Noise-canceling microphone reduces background noise
- Pivoting, bendable boom provides optimal fit
- Call answer/end and one-touch voice-activated dialing* (MX153-M1, MX153-N1, MX153-N3)

MX100 Series
Superior Stability and Quality Sound

MX100, MX103-N1, MX103-N2 MX103-N3
- Flex Grip® design for exceptionally stable fit
- AcuSpeak™ technology makes conversations clear
- Customize the headset with three interchangeable color covers
- Call answer/end and one-touch voice-activated dialing* (MX103-N1, MX103-N2, MX103-N3)

M220 Series
Mobile and Cordless headsets

M220, M223-N1, M220C
- Over-the-ear design
- Fits on either ear comfortably with flexible earloop
- Optimal voice clarity with noise-canceling microphone
- Optimized for cordless phones (M220C)
- Call answer/end button* (M223)

M205 Series
Ultra-Light Design and Quality Sound

M205, M206-N1, M206-N2
- Flexfit™ styling for secure, comfortable fit
- Compact design with AcuSpeak™ technology for clear conversations
- One-touch volume and mute controls (M205)
- Call answer/end, one-touch voice-activated dialing* and volume controls (M206-N1 and M206-N2)

M170 Series
Ultimate Sound Quality and Two Wearing Styles

M170, M175
- Convertible style you can wear over-the-head for stability or over-the-ear for portability
- Optimal voice clarity with noise-canceling microphone
- Enhanced sound quality with microphone adjust switch for cordless phones
- One-touch volume and mute controls (M175)

M130 Series
Ultimate Sound Quality and Adjustable Fit

M130, M133-N1, M133-N2, M135
- Sleek, over-the-ear design
- Superior sound quality with adjustable microphone boom
- Fits on either ear comfortably with flexible earloop
- Optimal voice clarity with noise-canceling microphone
- One-touch volume and mute controls (M135)
- Call answer/end and one-touch voice-activated dialing* (M133-N1, M133-N2)

M110 Series
Secure Fit and Quality Sound

M110, M114
- Adjustable headband provides comfortable, secure fit
- Optimal voice clarity with noise-canceling microphone
- Works with headset-ready cordless and mobile phones
- One-touch volume control (M114)

M60 Series
Simple, convenient one-piece design

M60, M60-N1
- Over-the-ear design for a stable fit
- Boom-mounted microphone allows you to be heard clearly

M40 Series
Simple in-the-ear design

M40, M40-N1
- In-the-ear design
- Inline microphone

*Voice-activated dialing must be supported by your phone or service.

Increase your retail profits this holiday season with Plantronics headsets from TESSCO.

TESSCO TECHNOLOGIES®
800-472-7373

Flex Grip® Headsets for Comfort and Stability

Plantronics® MX100 Series mobile phone headsets feature the unique Flex Grip® design, which produces an exceptionally stable, comfortable fit and allows for one-handed placement in the ear. The MX100 has a discreet design and an in-line microphone with Plantronics AcuSpeak® technology for clear conversations. Variants of the MX100 are available with a call answer/end button. The MX100 series headsets are your customer's best choice for a discreet headset with superior stability and quality sound.

MX100: Superior Stability and Quality Sound

Plantronics MX150 Series headsets feature Flex Grip design for an exceptionally stable, comfortable fit, and a noise-canceling microphone that reduces background noise so you can be heard clearly in almost any environment. The MX150 also has a pivoting, flexible boom for optimal microphone positioning. Variants of the MX150 are available with an in-line call answer/ end button. The MX150 Series headsets are your customer's best choice for the most flexible fit and superior sound quality, especially in noisy environments.

Stock up this holiday season with Plantronics MX100 and MX150 Series headsets in a dual-slot countertop display. Ask about the special display offer available with a minimum purchase from TESSCO. Plantronics offers many variants of the MX100 and MX150 Series headsets for compatibility with most current wireless phones. *Visit TESSCO.com or call 800-472-7373 for more information regarding handset compatibility.*

Product information and performance claims are provided by manufacturers.

New!

Make a Nokia Hands-Free Solution Part of Your Family

Soccer practice. School recitals. Birthday parties. These days, parents have no shortage of places to be. And fortunately, nothing can help them stay on top of it all quite like a mobile phone. However, drive time often ends up being the most convenient time to make calls. And with kids in the back and the road up front, it isn't always easy.

That is, until now. That's because a hands-free car solution from **Nokia** can make your customers' calls – and their commute – a lot easier. You see, with hands-free technology, Mom can make a call without ever taking her hands off the wheel. And best of all, Nokia offers a wide selection of models to choose from. From their lightweight, easy-to-install portable enhancements to their more advanced kits—featuring superb sound quality and optional Bluetooth wireless connectivity—your customers are sure to find a solution that's perfect for their families.

Take the Nokia Plug-in Car Handsfree. This hands-free unit is ideal for anyone looking for value, simplicity and portability because it plugs directly into a 12-volt cigarette lighter, making it a cinch to transfer from one car to another. Talking's a breeze, too, with its built-in speaker and integrated microphone. And it'll even charge a phone while it's being used.

Then there's the more advanced Nokia Headrest Handsfree. Mounting smartly to the headrest of your customer's car, this innovative and stylish handsfree combines all the portability and audio quality of the plug-in handsfree with an intelligent cable management system that reduces the number of cables needed.

Headrest Handsfree

Advanced Car Kit

And for those customers that spend a lot of time on the road, you might recommend the more integrated Nokia Advanced Car Kit. Complete with a remote control to make calling easier, this breakthrough system enables drivers to make hands-free calls wirelessly via Bluetooth. Plus, it offers a host of superior features, including external loudspeaker output, mobile phone charging, car radio mute, and much more.

Plug-In Car Handsfree

No matter what level of handsfree your customers need, you can be sure Nokia has the perfect solution. *To learn more, or to order a Nokia hands-free car enhancement, visit TESSCO.com or call 800-305-9772. Your customers—and their families—will thank you for it.*

TESSCO Part No. 473655
Headrest Handsfree
Retail: $99.00

TESSCO Part No. 420678
Advanced Car Kit
Retail: $179.00

TESSCO Part No. 460680
Plug-In Car Handsfree
Retail: $79.00

CATALOG AGE
Strategies for Profitable Multichannel Marketing
Catalog Age Ranks TESSCO in Top 100
Visit http://catalogagemag.com/ar/marketing_catalog_age_ranking

TESSCO TECHNOLOGIES®

Introducing three new handsfree car solutions from Nokia.
With our wide variety of handsfree enhancements, nothing comes between your customers and the wheel. To learn more, visit TESSCO.com/go/retail, or call 1-800-305-9772.

Headrest Handsfree
TESSCO Part No. 473655

Advanced Car Kit
TESSCO Part No. 420678

Plug-In Car Handsfree
TESSCO Part No. 460680

NOKIA
CONNECTING PEOPLE

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Go to Extremes this Holiday with TESSCO Accessories

Your Total Source
ASK FOR THE GUIDE
YOUR VIRTUAL ACCESSORY STORE.
RELIABILITY THAT WON'T LET YOU DOWN.
IF YOU'RE LOOKING FOR A TIGHTER GRIP ON YOUR CUSTOMER BASE, work with TESSCO to stock the latest accessories for the hottest phones and high tech products. TESSCO has both the depth and breadth of products you need, in both the OEM and aftermarket lines. Our own Wireless Solutions® brand offers your customers a choice in price point without compromising quality. TESSCO also has hard to find Bluetooth® products from Motorola®, Sony Ericsson®, Jabra®, Plantronics® and others. TESSCO's far-reaching technology, combined with outstanding customer service, sales training, easy-to-navigate website, e-commerce and merchandising solutions keeps you on top.
RELY ON TESSCO FOR ALL YOUR WIRELESS ACCESSORIES.
Your Total Source TESSCO Everything For Wireless
CALL US AT 1.800.305.9772 OR VISIT US ONLINE AT TESSCO.COM/GO/RETAIL

Partner with TESSCO for your holiday buying and get an EXTREME jump on the latest technology and the deepest inventory. TESSCO is Your Total Source® supplier for OEM and quality aftermarket wireless accessories. Be first to market with the latest accessories for the hottest phones and high-tech products.

TESSCO provides you with the solutions to offer your customers a choice in price points without compromising on quality. Our powerful combination of OEM and Wireless Solutions® aftermarket accessories offers a wide selection of inventory including hard-to-find Bluetooth products from Motorola, SEMC, Jabra and Plantronics. And, our reliable delivery ensures your shelves will be well stocked for the holiday.

Experience hassle-free holiday buying with TESSCO. You can count on us to deliver what you need, when and where you need it every time. We guarantee it!

Our Good, Better, Best Story

TESSCO uses a unique strategy that lets you select the right product assortment for your business. "Good" products, under the Wireless Solutions brand, offer a good value alternative for your more price-conscious consumer. When you need "better" options, TESSCO's premium aftermarket accessories from Wireless Solutions is a broader line of high-quality engineered and quality-tested accessories for all the hottest phones.

We always recommend offering your customers' a "best" option. And, we have the broadest selection of accessories from the original manufacturer of the handset including Audiovox, Handspring, Kyocera, LG, Motorola, Nokia, Panasonic, Research in Motion (RIM), Samsung, Siemens, and Sony Ericsson, and Motorola iDEN. In addition, we offer products from other top brands like Body Glove, Jabra, Plantronics, Milante, and more. *For more information on our extensive products serving the retail market, please visit www.tessco.com/go/retail.*

Be Prepared!

Bluetooth technology is finally reaching the mainstream consumer; don't get caught without a deep stock of accessories. Look to TESSCO for the industry's most comprehensive selection and deepest inventory of Bluetooth products and accessories from leaders like Jabra, Motorola, Nokia, Plantronics and Sony Ericsson. Come to us first when making your holiday buying decisions on the newest headsets and car kits. *Visit www.tessco.com/go/bluetooth for more information.*

Quality People and Hassle-Free Buying

Partner with TESSCO and you'll find a professional team that is focused on you and your unique needs. At TESSCO, we pride ourselves on our professionalism and commitment to making your buying experience hassle-free. Each team member is highly trained to present custom solutions for product delivery, merchandising, training and e-commerce—catered to your needs. Take a look at our newly designed Web site. It's easier to navigate, find the product you need, check availability, expedite your ordering process and schedule delivery. *Go to TESSCO.com and begin the experience.*

Merchandising Solutions

TESSCO's unique merchandising solutions will increase your accessory attach rate. The strategic matrix selection design and our innovative accessory sales system are proven to drive impulse and multiple purchases. These easy-to-assemble accessory sales systems are used to display either OEM or Wireless Solutions® accessories, or qualified customers can private label with their own corporate design. *Visit www.tessco.com/go/merchandising to learn more.*

Custom Private Label and Indirect Dealer Programs

Want to develop your own brand of aftermarket accessories? TESSCO offers customized private-label packaging and merchandising solutions for qualified customers. Our current private-labeling partners include, Cell One, Ntelos Wireless, and Cell Communications. Carriers. Use this opportunity to private label your own high-quality aftermarket accessories and offer them to your indirect dealer base through our turn-key indirect dealer solutions. TESSCO is likely to have a special program designed to increase your profitability. See how TESSCO's special programs can address your business needs. *To learn how to qualify, please call your TESSCO account manager at 800-305-9772.*

Choose TESSCO, your reliable source for everything wireless, to take you to profitable EXTREMES.

Product information and performance claims are provided by manufacturers.

New! BlackBerry Accessories Ready for Prime Time

BlackBerry is one of the hottest, and fastest growing wireless devices in the world. Currently, there are over 1.3 million subscribers and the numbers are growing approximately 30 percent each quarter. Accessories are hot for the device, too, and TESSCO has them all!

TESSCO is the only distributor that is able to buy accessories direct from **RIM**. We carry every OEM accessory for every BlackBerry model made, from the original legacy handhelds, to the early monochrome voice handhelds, to today's hottest color and voice handhelds from T-Mobile, ATT Wireless, Cingular Wireless, Verizon Wireless and Nextel.

Hot off the press… Come to TESSCO for accessories supporting RIM's newest BlackBerry handheld, T-Mobile's Bluetooth®-enabled 7100t. By virtue of our direct buying relationship, TESSCO can offer the best OEM wholesale pricing, and guarantee consistent product availability.

TESSCO is unique in yet another way. We are now offering all BlackBerry accessories in retail clamshell packaging as part of our proven merchandising system. No more white box products, no more hiding BlackBerry accessories under the counter or in the back room. You can now proudly display BlackBerry accessories right on the retail floor, peg hooked to the wall, in a free-standing display, or sitting on top of your counter.

Our attractive clamshell packaging, used in concert with our unique merchandising displays, is designed to drive customer awareness and stimulate impulse purchases. Your customers can't ask for what they don't know you have. Show them what's available and watch sales increase dramatically. TESSCO's merchandising sales system has been proven to increase customer purchases by over 30 percent.

Come to TESSCO for all your BlackBerry accessories and create a merchandising experience that is proven to increase sales! *Visit www.tessco.com/go/blackberry or call 800-305-9772 for more information.*

TESSCO Everything For Wireless

Introducing Performance Packaging

Make TESSCO Your Total Source for BlackBerry Accessories and Merchandising.

- NEW Retail Packaging
- LARGEST Selection of BlackBerry OEM Accessories
- BEST wholesale pricing
- DRIVE customer awareness and increase sales
- NO-RISK, 30-Day Return Guarantee

Outperform the competition—Display BlackBerry accessories where they can impact your business the most...on the retail floor!

BLACKBERRY®

1-800-305-9772
www.tessco.com/go/blackberry

Mobile Electronics Mounting Solutions

PanaVise Products, Inc. combines custom mounting solutions with off-the-shelf convenience for a wide range of mobile electronics including ***satellite radios, PDAs, GPS units, hands-free kits, MP3 players,*** *and* ***mobile data terminals.*** *Your TESSCO representative can help you find the best PanaVise solution for your next installation!*

- Custom dash mounts
- Pedestal mounts
- Flex mounts
- Mobile video mounts
- Windshield mounts
- MDT & radio mounts
- Phone holders
- Mounting brackets

PANAVISE®

TESSCO TECHNOLOGIES®
800-472-7373

Product information and performance claims are provided by manufacturers.

New! Bluetooth Headsets and Adapter Enable Hands-Free Communications

Jabra, the leading brand in hands-free communications products, introduces two new Bluetooth® headsets, and a new universal multi-adapter to enable non-Bluetooth phones to work with JABRA headsets.

Keeping it simple, the Jabra BT-110 (TESSCO Part No. 428669) is for anyone who wants to enjoy the full benefits of a wireless headset. It provides 15 hours of talk time on a single AAA battery and its automatic power-down feature allows the user to never worry about standby time. Its lightweight (26 grams), secure behind-the-ear design and MiniGel™ technology provides optimal quality and extended wear and comfort for all calls. The headset supports voice dialing and allows users to accept or reject incoming calls. Jabra BT110 also features both the headset and hands-free profiles, making it compatible with all Bluetooth phones.

TESSCO Part No. 428669
Wireless Headset
Retail: $69.00

Offering high performance and added features, the stylish Jabra BT800 takes Bluetooth headsets to the next level. Weighing only 25 grams, the headset's new ear-hook design ensures a secure and comfortable fit. With up to 6 hours of talk time and 200 hours of standby time, the headset features a backlit LED display for caller ID and an easy-to-use jog wheel to access menu options. In addition, users can select their favorite ring tones in the headset or use the built in call-vibrate feature. The headset also features DSP (digital signal processing) that improves audio quality in noisy environments and automatically adjusts volume levels in response to background noise. Users can also mute the headset with one touch. Jabra BT800 complies with Bluetooth version 1.2. *Call for pricing availability.*

Use any Jabra Bluetooth headset or speakerphone with your non-Bluetooth phone. The Jabra A-210 universal multi-adapter (TESSCO Part No. 496619) is small and lightweight with a sleek design weighing less than 0.7 ounces. The A-210 will be compatible with all Jabra Bluetooth headsets and will work with phones that have a standard 2.5 millimeter audio jack. The adapter features a three-position control optimizing audio volume and will operate while charging.

Wireless Headset

Ear-Hook Headset

Universal Multi-Adapter

Visit TESSCO.com or call 800-305-9772 for more information.

TESSCO Part No. 496619
Universal Multi-Adapter
Retail: $59.00

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*For your current pricing and our complete product offering, visit TESSCO.com or call TESSCO.

ProTalk® Radio Is the Right Choice for On-Site Communications

The ProTalk® (TK-2200/3200) portable is newly designed, with additional features for job site communications in manufacturing, industrial, construction, warehousing, retail, restaurants, hotels and facility management applications.

ProTalk® TK-2200/3200 Radio

The new Super Lock feature disables all but push-to-talk (PTT) and volume settings to prevent accidental channel changes. The ProTalk now has a Wireless Cloning option, exclusive to **Kenwood**, to duplicate setup of multiple units. The Time-Out Timer conserves the battery and allows for up to 18 hours of talk time (5-5-90).

A sleek and rugged case makes this radio easy to use, with large channel and volume knobs. This super-durable radio has met all eleven Mil-Std 810 C, D, E and F standards for ruggedness and water resistance, including the "blowing rain" specification and passes international IP 54.55 moisture and dust tests.

ProTalk now has internal VOX so it is hands-free ready, with the addition of a Kenwood headset. The portable features Kenwood-enhanced audio, with high clarity and fidelity, and speakers that deliver up to 500 mW.

The two-watt ProTalk comes in two- and eight-channel models. The VHF version (TK-2200 has 27 pre-stored frequencies. The UHF model (TK-3200) has 56 pre-stored frequencies. Each has a range of up to six miles. Each ProTalk comes complete and ready-to-use with an 18-hour NiMH battery, three-hour fast charger, spring-action belt clip and antenna.

This newest Kenwood ProTalk® radio is the right choice for on-site communications when you want superb performance, ruggedness and a mix of features you'll rely on every day. *Visit TESSCO.com or call 800-472-7373 for more information.*

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Farmersville, TX

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Desktop Charger

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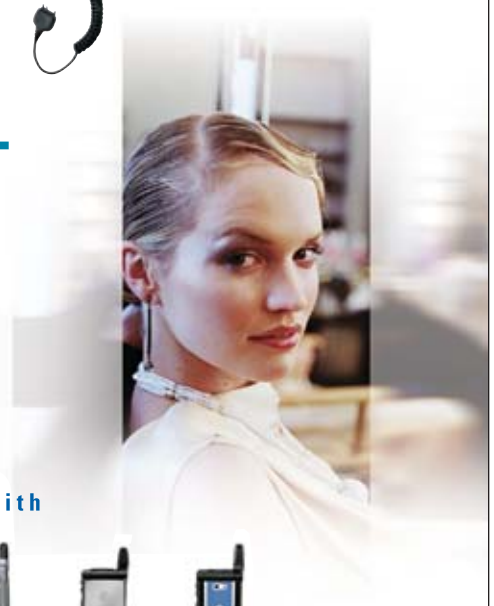

Compatible with

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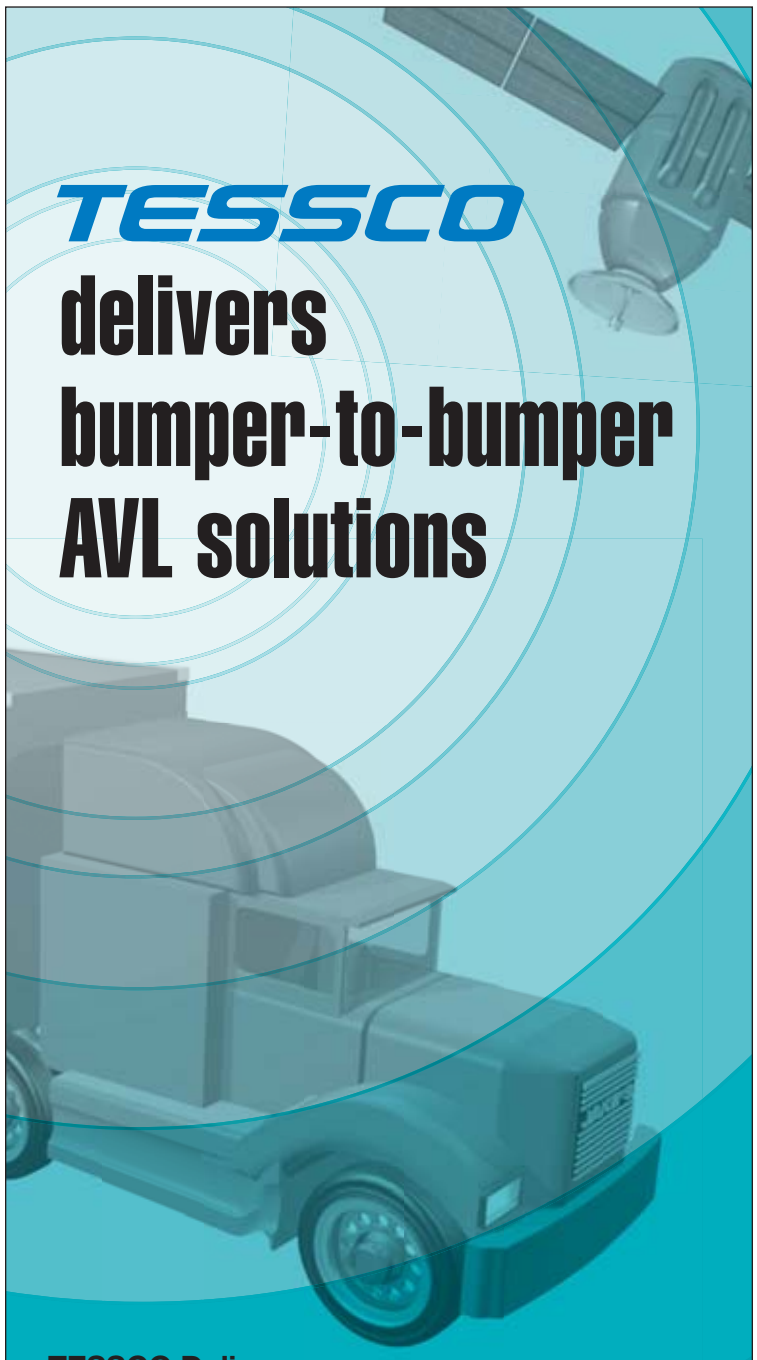

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- GPS multi-band antennas from world-class manufacturers for your unique installation environment
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Product information and performance claims are provided by manufacturers.

Get Rapid Deployment with Liberty™ Extender Repeater System

Ritron's compact Liberty™ Extender Repeater System has been designed specifically for on-site conventional two-way radio applications virtually eliminating shadowing, fading, and dead spots. The integrated, full-duplex, PC programmable on-site repeater system package includes four portable radios and a wireless intercom/base station. When antenna location is optimized for the area of operation, the Liberty repeater will effectively extend coverage, beyond point-to-point, to provide long-range wireless two-way voice communications for police and fire departments responding to tactical and emergency situations.

Liberty Extender Repeater System

The Liberty operates on 110 VAC or 12 VDC allowing flexibility for any situation. Plus, its laptop size and 3.5-pound weight allow for greater portability, easy of installation, and rapid deployment. The portable radios and base station are factory programmed to work specifically with the Liberty repeater as an integrated system.

This repeater features a single board design with a built-in duplexer, CTCSS, DCS, 70 dB intermodulation rejection, and 0.35 µV sensitivity at 12 dB SINAD. Other features include 450-470 MHz frequency range, +/-1.5 ppm frequency stability, PC programmable, and 2-watt power output. The Liberty is rated at 100-percent continuous duty cycle and available in either wide or narrow selectable bandwidth for maximum flexibility. *Call TESSCO at 800-472-7373 for more information.*

TESSCO Part No. 413665
Liberty Extender Repeater System
Retail: $2,299.00

Prices shown are for comparison only*

Elevated Feed Dual-Band Antenna Now Available for Trucking Applications

Andrew Corporation's Antenna Specialists brand of mobile products is expanding its cellular/PCS dual band series to include an elevated-feed option. Model ASPDM913U (TESSCO Part No. 433678) has been designed to meet the needs of the long-haul trucking market.

As with all elevated-feed antennas, this model is ground-plane-independent and provides omnidirectional coverage. The antenna may be mounted on the mirror or side body of a truck cab. For installation convenience, the mount is pre-packaged with the antenna. ASPDM913U features a black DURA-COAT™ finish for the whip and ferrule while the antenna extension is black polycarbonate, providing a sleek appearance that blends well with all cab styles.

Covering 824-894 MHz and 1850-1990 MHz, ASPDM913U offers 3 dB gain in both frequency bands with a maximum VSWR of 1.9:1 in each band. The antenna is supplied with 17 feet of PRO-FLEX™ PLUS low-loss cable and an attached FME connector. *Visit TESSCO.com or call 800-472-7373 for more information.*

TESSCO Part No. 433678
Dual-Band Antenna, Elev. Feed
Retail: $100.00

Dual-Band Antenna

A True Universal Charger? Just Ask Me!

A TRUE UNIVERSAL CHARGER will charge all major radio manufacturer's batteries: Icom, Kenwood, Vertex, Motorola, etc.

If the radio utilizes all three chemistries, Nicd, Nimh or Lion, you will only need one adapter cup to accomplish charging the various battery chemistries.

What makes the UC-1 even more unique is that without any tools you can simply replace the adapter cups and the UC-1 will then charge another manufacturer's radio batteries.

For additional information and pricing please contact us.

Ronie
VP of Operations

UC-1
UNIVERSAL CHARGER

+W&W− WHERE QUALITY IS #1

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*For your current pricing and our complete product offering, visit TESSCO.com or call TESSCO.

Car Kit with No Installation

Parrot's revolutionary off-the-shelf, consumer electronics product, DriveBlue™ is the first Bluetooth® hands-free car kit requiring no installation. It's fast and efficient, offering a cost-effective, Plug-n-Drive voice-recognition solution that creates a safe, wireless in-car environment.

Instantly and wirelessly, DriveBlue provides advanced hands-free functionality, without the constraints of other Bluetooth car systems that require hard-wire installation. Plug DriveBlue into any car's cigarette lighter and it will work with all Bluetooth-enabled phones currently on the U.S. market.

Make and receive calls hands-free while driving with your mobile phone still inside your pocket, on the backseat, or even in the trunk of your car. Simply

DriveBlue Car Kit

enter your information into the system's address book and voice-recognition dialing gives you an automatic connection in full duplex mode within a range of 10 meters (33 feet).

DriveBlue offers a wide range of features:

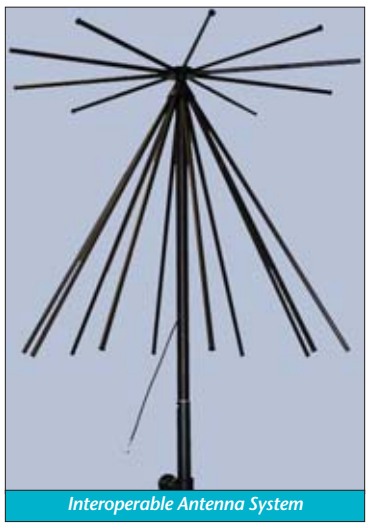
- Installation-free: Plugs into any car's cigarette lighter
- Universal: Compatible with all Bluetooth-enabled phones regardless of carrier
- Voice recognition dialing: Speed dial from your DriveBlue or phone memory

Parrot's CK3100™, which recently made its U.S. debut, is the first in a series of advanced hands-free car kits that incorporate a voice-based, LCD display screen for drivers to safely view and navigate through menu options. Also compatible with all Bluetooth-enabled phones and easily installed in any vehicle, the CK3100 provides a driver with all of the benefits one would expect from today's mobile devices, but not necessarily within a vehicle.

For more information on Parrot's products including the CK3000, the first-ever Bluetooth car kit, call 800-305-9777 or visit TESSCO.com,

Seamless Communications for First Responders

STI-CO's interoperable antenna system is designed to complement interconnect transmission systems during critical incidents. This tactical antenna enables first responders from different agencies to communicate seamlessly while using one common antenna. The tri-band coupler supplied contains ports to connect VHF, UHF, and 800 MHz transmission devices to the intelligent interconnect system, eliminating the need to set up multiple antennas. An optional coupler for the aviation band is also available. This ground-plane independent, rugged discone



Interoperable Antenna System

antenna is extremely broad-banded and the no- tool setup takes just minutes. The antenna covers from 106 to 1550 MHz at <2:1 and will easily handle up to 150 watts per transmitting device. System includes tri-band coupler, low-loss cable, feedlines, and connectors. Options include a rugged black Pelican® carrying case, aviation band coupler, and a tripod for mounting. *Visit TESSCO.com or call 800-472-7373 for more information.*

TESSCO Part No. 485638
Tri-Band Antenna Kit
Retail: $750.00

TESSCO Part No 499626
Antenna Case
Retail: $275.00

TESSCO Part No. 439600
Black Tripod
Retail: $100.00

Overcoming Passive Intermodulation in Antenna Design

(continued from page 2)

- ✓Avoid unsoldered braided coaxial cables and minimize flexing if used.
- ✓Ensure that plating solutions are not contaminated and do not use excessive "brighteners" that significantly decrease conductivity.
- ✓Make sure that surface finish is smoothed to 0.4 mm or better.
- ✓Select PC boards that use rolled, annealed copper foil rather than electro-deposit copper foil.

Proper low passive intermodulation devices and installation procedures will help you reduce the effects of passive intermodulation in your systems.

For more information on Sinclair Technologies products for achieving low levels of intermodulation, see page 6.

Remote System Monitoring with Communications System Analyzers

(continued from page 3)

Web-cam software application located on the remote site PC. Second, key press information is efficiently exchanged between the sites using a client/server pair in the form of LabView™ executables. Third, two-way audio signals are sent over the network between the remote site and central command site.

Benefits of a Remote System Monitoring Application

Remote system monitoring provides numerous benefits. It makes troubleshooting and maintaining optimal performance of the user's communications systems easy and cost effective by using readily available off-the-shelf software and consumer electronics along with the remote site control and central command site applications available at no charge.

From the central command site, commands can be sent to the remote site control application to identify necessary adjustments or narrow in on system failures to identify specific maintenance needs. Unnecessary trips to the remote location are eliminated.

The PCs used with the system can easily be upgraded to accommodate future needs. Since the PC uses the standard Microsoft Windows operating system, setup is simple and familiar and support is widely available. Remote maintenance solutions are available using existing capabilities within Windows; the system is fully recoverable from unexpected power loss.

This article is excerpted from a technical paper that can be viewed in its entirety at www.tessco.com. For more information on how Fluke products perform remote system monitoring, see page 23.

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- Everything you need to provide flawless installations

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Product information and performance claims are provided by manufacturers.

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TESSCO Is Your Superstore for GPS Fleet Tracking!

One size fits all—no more! TESSCO offers more than a dozen client-based and Web-based solutions for your GPS fleet tracking and asset management needs, from AVL specialist **TrakPro**.

Why Should You Choose TrakPro?

- **Ubiquitous coverage in remote areas!** You can run but you can't hide from tracking products with satellite communications from OrbComm and GlobalStar, covering the world. Or choose low-cost solutions using Cellemetry communications, covering 99.9-percent of the US, Canada and Mexico, including a Web-based locator for cars and motorcycles, which competes against LoJack.
- **GPRS, CDMA, and now iDEN tracking products, all on one map!** Choose tracking solutions from the cellular carrier(s) that work best for you: CDMA 1xRTT on Verizon Wireless; GPRS on ATT Wireless, T-Mobile, or Cingular Wireless; or our newest offerings coming this fall on the iDEN network. Mix and match products, and still be able to see all your vehicles on one map!
- **Tracking products with NO monthly fee!** Don't pay for more than you need. TrakPro offers real-time tracking products that communicate on public and private two-way radio networks. Don't need real-time? Try our passive product, which collects information, and downloads data via RF signal upon return to the yard. And if you change your mind, this solution is fully upgradeable to a CDMA 1xRTT real-time active product.
- **Un-tethered solutions with self-contained power!** Don't loose that container at sea. TrakPro offers the only GPS tracking solution that has a five to seven-year battery life, and it uses ubiquitous satellite communications to boot.
- **Solutions for mobile and stationary objects, too!** TrakPro products aren't just for tracking moving vehicles, they also are fantastic as real-time asset management tools, for stationary equipment like, oil pumps and generators.

Visit www.tessco.com/go/trakpro for more information.

Attention Dealers!

TESSCO is recruiting dealers to complete a nationwide channel of motivated, trained, authorized representatives for TrakPro's unique products. Over 50 dealers, in nearly 30 states, have seen the value of offering TrakPro products to their customers … and you could be next! TESSCO and TrakPro will provide you frequent Webinar sales trainings, on-site sales support, a low-cost demo program, and lots of support documentation. *Call your TESSCO Account Manager today at 800-204-2286, and get on the track to greater success with TrakPro!*

Why Should Fleet Tracking Matter to You?

- Fuel consumption increases almost two-percent for each mile per hour above 50.
- Excessive idling can waste up to 800 gallons of fuel annually for the average truck.
- Tire wear will almost double at road speeds of 70 miles per hour (MPH) or greater.
- Increasing speed from 50 to 70 MPH increases vehicle maintenance costs by 80 percent.
- At 70 MPH, stopping distance is 63-percent greater than at 50 MPH, increasing the chance of accidents.
- With fleet tracking, companies have discovered employees going shopping, seeing movies and even dating during business hours.

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Ask your TESSCO representative for details.

Samsung offers unique accessories available nowhere else like the Charging Holster. Use it to prolong your phone's battery life between charges. An industry first!

For a limited time Samsung is offering a free carry case (redeemable by mail-in rebate) with the purchase of Game Pads for select phone models.

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Multi-Frequency Tone Remotes and Termination Panels

CPI introduces the TR Series multi-frequency EIA standard tone remotes. Standard on the TR10-4F and TR10-16F is monitor, intercom, front panel PTT, parallel status updating, crossmute, and many other features. These units are available in ash or black and a desk microphone option is available. Termination panel TTP216 is a full-featured programmable, 16- frequency EIA tone. No cable or programming software is required and pre-made cables (TESSCO Part Nos. 428319 and 445359) make this a plug and play install on some Kenwood and Motorola mobiles.

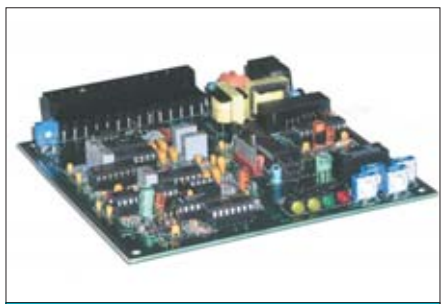
Also available are CPI's TTP (N) series single- and dual-frequency termination panels. *Visit TESSCO.com or call 800-472-7373 for more information.*

TESSCO Part No. 477383
Tone Remote, 4 Freq.
Retail: $510.00

TESSCO Part No. 436378
Tone Remote, 16 Freq.
Retail: $577.00

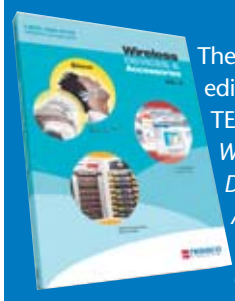
TESSCO Part No. 459309
Termination Panel, 16 Tx
Retail: $600.00

Tone Remote



TTP (N) Termination Panel

ASK FOR THE GUIDE: YOUR VIRTUAL ACCESSORY STORE.



The second edition of TESSCO's *Wireless Devices and Accessories Specialty Guide* is now available. Designed specifically for retailers, this wireless accessories guide shows you the full range of TESSCO accessory products and gives you an easy, convenient way to increase in-store accessory sales! Used as a counter top tool, its easy navigation and detailed specs will help you close accessory sales faster. *Call 800-305-9772 now to get your guide in time for the holiday rush or visit us on the web at www.tessco.com/go/retail for your entire holiday wireless accessory needs.*

Baffled by Wi-Fi Connectors? *(continued from page 3)*

MMCX connector apply to the RP MMCX. They are used on Demarc, Proxim/Orinoco and Zcomax/Zcom devices.

SMA, subminiature version A connectors, are one of the most common RF/microwave connector types used for frequencies from DC to 18 GHz. SMA males have hex shells with an internal gasket and a pin extending beyond the dielectric. SMA females have external threads and slotted sockets flush to the top of their dielectric. SMAs are used in 3Com, Clarion, Nokia and Senao devices.

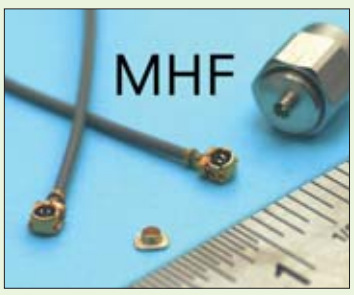
Reverse-polarity SMA connectors and standard SMAs share the same performance characteristics, but the pin and socket are reversed. If you are looking into the shell of the male connector body and see a flush socket and dielectric rather than raised pin, you have a reverse polarity SMA male. A raised pin in an SMA female connector indicates reverse polarity SMA female. RP-SMAs are found in AeroComm, Belkin, D-Link, GRE, Intel, Linksys, Maxtech, Netgear, Proxim/Orinoco, Siemans, Smart Bridge, Trango, US Robotics, WaveAccess, Zcomax and Zoomair devices.

Reverse-thread SMA connectors are otherwise identical to standard SMA connectors, but will not mate with them. To attempt to do so could damage both connectors. RT-SMAs are used in some Proxim/Orinoco Harmony devices.

The **TNC** is a 7/16-28 threaded connector, internally identical to BNCs, weatherproofed with an internal gasket, and operating from DC to 11 GHz.

The standard TNC male has a rotating shell with gasket, slotted ground ring with dielectric material extending to its edge, and a large air gap between this dielectric ring and the center pin. The TNC female has external threads and a slotted socket contact surrounded by a cylinder of dielectric material. When mated, the central dielectric of the female connector fits into the cavity of the dielectric ring in the TNC male and the tapered inner wall of the TNC female makes contact with the spring fingers of the slotted ground ring of the TNC male. TNCs are found on EnGenius, Senao and Wi-Lan devices.

Reverse-polarity TNCs swap the dielectric and contact configuration of the male with the female. The ground ring and body of the male are not affected. All other performance characteristics remain the same. RP-TNCs are used by Breezecom/ Alvarion, Cisco/Aironet, EnGenius, Hyperlink, Linksys, Proxim/ Orinoco, Senao, SMC, and US Robotics equipment.



The **MHF** micro-coax connector is equivalent to the Hirose U.FL and Ipex series connectors found in many Wi-Fi products. They are a low profile [2.5 millimeter mating height] and support dual-band 3-6 GHz applications. These connectors are used on EnGenius, Proxim/Orinoco, Senao and Zcomax/Zcom devices.

For more information on Wi-Fi connectors, visit Tech Support on TESSCO.com to download a helpful Wi-Fi cross-reference connector chart.

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- Batteries, cases, chargers, headsets—everything you need for your two-way application
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New

Take Your World with You

The portable wireless speaker HF800 by **Motorola** defies traditional expectations. This revolutionary new product takes wireless connectivity to a new level by invisibly and reliably creating a hands-free environment via Bluetooth® wireless technology. The HF800's remarkable design is astonishingly advanced, yet intuitive and simple to use.

Sounds Good

The crisp, clear sound quality of the HF800 is enabled by a powerful one-watt speaker that incorporates sophisticated duplex, echo and noise cancellation technology ideal for hands-free use in environments like your vehicle. The unique speaker technology and the sleek, world-class design ensure that everyone connected can hear clear sound, even in noisy environments such as in your vehicle.

Smooth Operator

Push in the power/volume control button on the left side of the sleek oval device to turn the speaker on and off and toggle it up and down for easy volume control. The unique multifunction key on the top of the device answers, ends, and initiates calls while also controlling three-way calling and call hold. With only two buttons to control the device, it is the smoothest operator around, freeing you up to do more important tasks.

Anywhere, Anytime

The HF800 by Motorola includes a convenient carry case that clips to your belt or the visor in your vehicle. As an in-vehicle solution, it requires no installation—so you can take it with you for the ultimate in flexibility. From your vehicle, set it on a desk or table and have instant conference calls with business associates or friends. Use it for calls when you want a little bit more privacy by simply plugging your standard wired headset into the headset jack on the speaker. All of these features make this the perfect anywhere, anytime, must-have companion product for your Bluetooth-enabled mobile phone. The flexible functionality let's you be your best wherever you do your best work.

Portable Wireless Speaker

Keep Talking

With up to three hours of talk time and one hundred hours of standby time, you can be certain that your calls will not be cut short. If you are running low on power, simply plug in the Motorola in-vehicle charger or travel charger that is compatible with your Motorola phone and quickly recharge on the go.

Speak Universally

The sleek Motorola HF800 is compatible with all other Bluetooth wireless technology 1.1-compliant devices by Motorola and most other manufacturers. With Bluetooth wireless technology, you'll be surprised how close the future really is. See how this new radio technology will simplify your life—at home, in your car, at work and play. *Visit TESSCO.com or call 800-305-9772 for more information.*

TESSCO Part No. 435590
Portable Wireless Speaker HF800
Retail: $119.95

Carry Case

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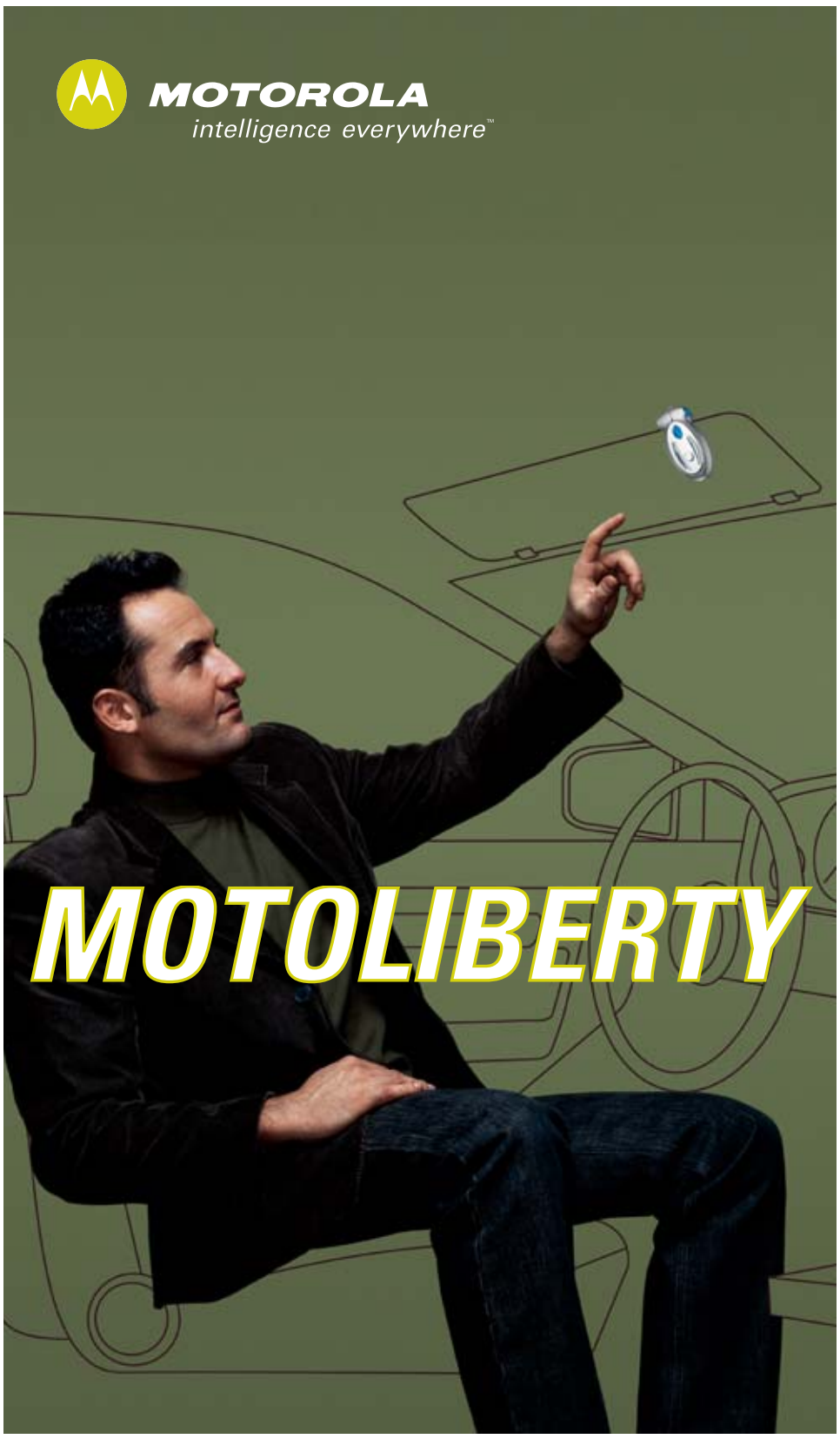
"We are new to TESSCO but I can already tell that you have it all down pat. No complaints here and I want to take this opportunity to say how refreshing it is to work with a company that strives to do it right."

The Cash and Smoke Shop
Henderson, Tennessee



Portable Wireless Speaker
HF800 with Bluetooth
TESSCO Part No. 435590

Wireless Headset
HS810 with Bluetooth
TESSCO Part No. 421537

Wireless Headset
HS820 with Bluetooth
TESSCO Part No. 425677

Wireless Car Kit
HFW8000 with Bluetooth
TESSCO Part No. 429493

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High-Capacity Replacement Batteries for Vertex Standard Radios

TESSCO now stocks **Multiplier** batteries for the Vertex Standard radios listed below.

Vertex Standard VX-510 Radios

Battery Type	mAh/Volts	Multiplier Part No.	TESSCO Part No.	Retail
NiCd	2000 mAh/7.5 volts	MFNB-29X	424661	$ 96.90
NiMH	2700 mAh/7.5 volts	MFNB-29H	442670	$108.80
NiMH	4000 mAh, 7.5 volts	MFNB-29HX	495638	$108.80

Vertex Standard VX-400, VX-210 Radios

NiCd	700 mAh	MFNB-64	441635	$ 59.35

Coming Soon! Li-Ion, 1500 mAh battery for VX-900 Vertex Standard Radios

Multiplier uses only the highest performing NiCd, Li-Ion and NiMH cells including a rugged housing for extra strength. All batteries are the exact fit to both the radio and charger and are proudly made in USA. Multiplier is an ISO 9001:2000 company. *Visit TESSCO.com or call 800-472-7373 for more information.*

Battery for Vertex Standard VX-510 Radio

Continuous GPS Signal Reception for Asset Tracking and AVL Applications

Radiall/Larsen Antenna Technologies is proud to present a full line of GPS tri-band antennas designed for asset tracking and AVL applications. Their GPS development competency leverages dual-band and tri-band technology that enables continuous GPS signal reception when the co-located communications antennas are transmitting. All tri-band GPS antennas work on either 3 or 5 volts DC.

GPS Tri-Band Antennas

GPS tri-bands cover cellular (824-894 MHz), PCS (1850-1990 MHz) and GPS (1575.42 MHz) frequencies. Tri-bands have a gain of 2 dBi (Cell/PCS) / 22 ± 2 dB LNA (GPS). They are available in several mounting options: roof, interior glass, exterior and interior.

With a focus on antennas for low-power base stations, terminals, and mobile applications, Radiall/Larsen Antenna Technologies has been a premier manufacturer for over 30 years. *Visit TESSCO.com or call 800-472-7373 for more information.*

TESSCO TECHNOLOGIES®
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Make it smart.
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Here's a simple truth. Not all accessories are created equal.
Not only are Kyocera accessories made specifically for our phones, they're also rigorously tested to ensure proper fit, long-lasting quality and dependable performance. Keep it simple, choose Kyocera.
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Attractive Dome-Mount Antennas for PCS and WLAN

Mobile Mark's new dome-mount antenna is housed in an attractive, low-profile radome that is rugged enough to be suitable for heavy-duty applications. The antenna offers 2.5 dBi gain performance without an external whip. Models are available for applications in the 1.8-6 GHz range, including GPRS, 1xRTT, and 802.11a/b/g.

The new dome-mount antenna measures less than 3 inches in diameter and 1.5 inches in height and is available in either white or black ABS plastic. It mounts to a metal surface (roof, vehicle body, container, etc.) through a 3/4-inch hole. *Visit TESSCO.com or call 800-472-7373 for more information.*

Dome-Mount Antenna

Product information and performance claims are provided by manufacturers.

Ever Butchered a Lexus?

Why risk an angry customer...because you screwed in a free pedestal mount? Get it right, mount a cell phone on a Pro.Fit VSM. The original Vehicle Specific Mounting bracket provides a professional-fit in your customer's vehicle, guaranteed.

Smart design and complete instructions eliminate the guesswork and reduce liability. Installations are fast and worry free. Securely mount every phone on a VSM, use Handsfree and drive safely.

Call today 800-472-7373

www.tessco.com

Pro.Fit International®

VSM

Convenient Solutions For Your Lifestyle

TESSCO TECHNOLOGIES®

800-472-7373

Full-Featured Communications System Analyzers for Base Station/Subscriber Testing

General Dynamics manufactures and markets a comprehensive line of full-featured communications system analyzers. When your base station and/or subscriber testing requirements include standard two-way radio or paging, ASTRO™, APCO Project 25, SECURENET™, SMARTNET/SmartZone™, or iDEN™ protocols, General Dynamics has a solution for you.

Big Solutions for Any Budget

The R2590 communications system analyzer is a high-end analyzer at a low-end price. The unit's light weight, small footprint, and optional internal battery, combine to make it as valuable in the field as on the bench. Rugged enough to withstand heavy field use, the R2600 family of communications system analyzers consists of three models, each designed to help you save time and work more efficiently. With

R2590 Communications Systems Analyzer

the functionality of more than a dozen separate test instruments, the R2600 family is your total radio test solution.

Solutions for Project 25

The R2625, the economical solution, comes standard with comprehensive P25 diagnostic capability and DES-OFB encryption. The R2670 has optional P25 capability, and includes a tracking generator, cable fault finder, and programmable test setups. Motorola SMARTNET and SmartZone™ trunking can be added as well. Each model has a MTBF of over 33,000 hours and contains the functionality of more than a dozen test instruments.

AutoTest Software: Fast, Accurate and Easy to Use

General Dynamics' new AutoTest software for Motorola XTS5000™, XTS3000™ and ASTRO® SABER® public safety radios reduces overall test and alignment time, resulting in less hands-on time for technicians. Using General Dynamics R2625 or R2670 Communications Systems analyzer, this software enables the technician to test frequency, power, modulation, distortion, squelch and SINAD, as well as any required realignment. *Visit TESSCO.com or call 800-472-7373 for more information.*

Direct reading tester measures from 0 to 2000Ω and is auto-ranging, so it automatically seeks out the optimum measurement range.
AEMC
Easy-to-use
Simply connect the leads, Press-to-Measure and read the results!

Ground Testing Made Easy

Digital Ground Resistance Tester Models 4620 and 4630

- *Measures soil resistivity (4-Point)*
- *Measures ground resistance (2- and 3-Point) Fall-of-Potential method*
- *Step voltage tests and touch potential measurements*
- *Auto-Ranging: automatically selects the optimum range and test current*
- *Designed to reject high levels of noise and interference*
- *Extremely simple to operate: Connect – Press – Read*
- *Battery powered (Model 4620)*
- *AC powered with rechargeable NiMH batteries (Model 4630)*
- *Rugged dustproof and rainproof field case*
- *Can also be used for continuity tests on bonding*

Prices starting at $1195
TESSCO Part No. 454397

AEMC® INSTRUMENTS

TESSCO TECHNOLOGIES®
800-472-7373

Measure Forward and Reflected Power Without Elements!

The **Bird**® model 5012 is an easy-to-use, multifunctional, directional power sensor that measures both forward and reflected power! If you are looking for a power measurement product that can measure true average power, peak power, burst power, VSWR, CCDF, crest factor (peak to average ratio), and return loss measurements from 350 MHz to 4 GHz—the Wideband Power Sensor is your solution!

The Bird model 5012 is an accessory for the model 5000-EX DPM (the newest addition) to the Bird Digital Power Meter Series and the Bird Site Analyzer Series. Unlike the model 5010 digital power sensor, the new model 5012 is elementless; therefore, the traditional plug-in elements used in the past are no longer required to measure

Wideband Power Sensor

power. The 5012 directly connects to a PC, digital power meter or site analyzer. The connectivity offered with the model 5012 is a true advantage over the competition. No Black Box is needed! *Visit TESSCO.com for more information.*

TESSCO Part No. 410532
5000-EX with the 5012 Wideband Power Sensor
List: $3,095.00 Bronze: 3,064.05

TESSCO Offers Hands-On Training Classes and Seminars

As a supplier of emerging technologies solutions and test equipment required for today's evolving wireless applications, TESSCO provides a variety of training courses to keep you and your staff on the leading edge. *See page 4 for upcoming Training Classes and Seminars. Or, call 800-472-7373 or visit www.tessco.com/go/training for additional information.*

Attenuator Reduces Signal Levels from 100 Watts to 100 Milliwatts

Bird Electronic Corporation's model 100-SA-MFN-30 is a small, 30 dB broadband attenuator that reduces signal levels from 100 watts to 100 milliwatts or +10 dBm. An alternative use of the product as a load is possible if a low-power coaxial termination is attached to the output connector. Other attenuation values from 1 to 40 dB and frequency ranges up to 3 GHz are available with any combination of N or 7/16 connectors. Typical VSWR is 1.1:1. Fin width and depth are 2.75 inches; length is 5.845 inches less the connector. Included are 6-32 tapped holes for secure mounting. *Visit TESSCO.com or call 800-472-7373 for more information.*

TESSCO Part No. 477682
Bird RF Coaxial Attenuator
List: $265.00 Bronze: 262.35

Broadband Attenuator, 30 dB

Compact, Hand-Held T1 Test Set for Construction, Installation and Troubleshooting Applications

In a single 4-pound (1.8 kilograms) package, the 635 **Fluke Networks** QuickBERT-T1 includes all the basic T1 testing capabilities you would expect in a larger and more expensive tester. It performs bit-error tests, detects framing type, line coding and bit pattern, and displays signal level, frequency, clock slips, errors and alarms. The 635 transmits the most commonly used loop codes, including HDSL. Full, unframed and fractional (56 k and 64 k) T1 are supported, along with display of signaling and data bits and capture of DTMF digits. In addition, individual voice channels can be monitored on the built-in speaker or over a headset.

Eleven standard BERT patterns are available, including a 64-bit user-defined pattern. The 635 also includes a "through" mode where the incoming pattern is retransmitted. Errors—including bipolar violations, logic and frame bit—can be injected to confirm proper handling by the network. Two receivers permit detection of any clock slips. Multiple receiver input types allow terminated, bridged or monitor (DSX) connections. Either recovered or internal clock references can be

QuickBert-T1 635 Tester

selected. AMI or B8ZS line coding can be transmitted and received, and SF, ESF, SLC96 and unframed framing are supported.

Here's what you'll get:

- A full-featured, hand-held T1 test set at an affordable price.
- Instantaneous detection and display of framing, line coding, errors, alarms, level, frequency and more.
- A unit that transmits and receives common bit error rate test (BERT) patterns and includes all common loop codes, including HDSL.

Visit TESSCO.com or call 800-472-7373 for more information.

TESSCO Part No. 418111
QuickBert-T1 635 Tester
List: $2,450.00 Bronze: 2,437.75

Product information and performance claims are provided by manufacturers.

TESSCO TECHNOLOGIES®

First Hand-Held Spectrum Analyzer with Coverage up to 7 GHz

Emerging wireless technologies such as 802.11, 3G, and ultrawideband (UWB) are adding congestion to an already crowded spectrum. To meet the testing requirements posed by such a diverse and converging wireless environment, **Anritsu Company** has developed the MS2721A, the first fully functional hand-held spectrum analyzer. The next generation of Anritsu's popular Spectrum Master™ family, the MS2721A is a true general-purpose spectrum analyzer with unparalleled performance, as well as broad frequency coverage of 100 kHz to 7.1 GHz, giving wireless engineers and field technicians a single instrument for virtually all their spectrum analysis needs.

A new innovative platform that includes advanced DSP technology was used to develop the MS2721A. The result is a compact instrument measuring only 12 L x 8 H x 3 D (inches) and weighing 6.4 pounds that can ensure the integrity of data/voice transmissions as well as identify interfering signals. These analysis capabilities are especially important due to the increased number of RF signals created by the roll out of the new wireless infrastructures.

Hand-Held Spectrum Analyzer Is Convenient for Field Use

Field technicians not only have the benefit of compact size but also ease of use when using the MS2721A. With the hand-held spectrum analyzer, measurements such as field strength, channel power, occupied bandwidth, adjacent channel power ratio (ACPR), and carrier to interference ratio (C/I) can be made with the press of a single button. The accuracy of these measurements is ensured by the performance of the MS2721A. The hand-held spectrum analyzer has phase noise of –100 dBc/Hz at 10 kHz, and a DANL of –153 dBm. It also has fast sweep speeds and a resolution bandwidth (RBW) of 10 Hz to 3 MHz. Previously, this type of performance could only be found in benchtop spectrum analyzers.

Borrowing much from Anritsu's popular Spectrum Master design, the MS2721A has a rugged case that can withstand the harsh environments and terrain associated with field use. It also has a simple multilingual, customizable user interface in English, Spanish, French, German, Chinese, Japanese, Italian and Korean, similar to all of Anritsu's hand-held products.

The MS2721A has many new features specifically developed for field use. It has an 8.4-inch TFT-LCD color display that makes viewing measurements easier than ever before. A lithium-ion battery is used to give the MS2721A long life, as well as durability. It also has a wide operating temperature of –10 degrees C to +55 degrees C. A variety of ports, including a compact flash slot, as well as Ethernet 10/100 and USB 2.0, make it convenient to upload or download field data.

Extremely flexible, the MS2721A can be used in almost any field application. Technicians can use the hand-held spectrum analyzer to measure both existing commercial wireless networks as well as emerging technologies. It can also be used to measure private wireless networks, including those employed by the public safety profession as well as the military. *Visit TESSCO.com or call 800-472-7373 for more information.*

Spectrum Analyzer

Benchtop Performance
INSIDE & OUT
Spectrum Master™ MS2721A
100 kHz to 7.1 GHz frequency range
-153 dBm typical displayed average noise level @ 1 GHz
-100 dBc/Hz SSB phase noise @ 10 kHz offset
Ethernet and USB 2.0 remote control
TESSCO Part No. 422611
7.1 GHz

TESSCO TECHNOLOGIES®
800-472-7373

Introducing the Anritsu MS2721A Spectrum Master

Leave it to Anritsu to create the first handheld/benchtop Spectrum Analyzer that weighs 6.4 pounds with the test capabilities of large laboratory test equipment. Just imagine the possibilities for your group!

With measurements from 100 kHz to 7.1 GHz, the Anritsu MS2721A Spectrum Analyzer will allow you to match any standard high-performance benchtop instrument while providing the flexibility and affordability of a handheld device.

- Easy-to-use
- Ultra-Portable
- Accurate, repeatable measurements
- Multiple one-button measurements
- LAN connection for remote use

Designed with the user in mind, the MS2721A brings the quality long associated with Anritsu products to a whole new level. Take your lab with you, wherever you go!

SiteMaster | SpectrumMaster | CellMaster

A Family of Measuring Tools

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Want to reach 100,000 wireless professionals with your product and brand message?

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Product information and performance claims are provided by manufacturers.

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*For your current pricing and our complete product offering, visit TESSCO.com or call TESSCO.

Unscrew Security Fasteners on Cell Phones and PDAs

The latest Sanyo cell phones, PDAs, and other higher-priced electronics devices are using specially designed security screws to prevent "unwanted" fingers from opening and tampering with proprietary devices. The head on this specially designed **Wireless Solutions®** security screwdriver has machine-milled, S-2 tool steel, and a #00 offset tri-wing head. Created with phone service centers in mind, this driver has an ergonomic handle with easy-turn top and is used to repair the latest Sanyo cell phones, Sony Gameboys and other devices. *Visit TESSCO.com or call 800-472-7373 for more information.*

TESSCO Part No. 437670
Security Screwdriver
List: $2.25 Bronze: 2.19

Security Screwdriver

The Drill Bit Set for Precision Hole Sizing

Your **Wireless Solutions®** 60-piece HSS wire gauge jobbers drill bit set features twist drills and has a ground 135-degree tips for precision drilling. This is the set you need when your job requires precision hole sizing. Your twist drills are designed for high-temperature applications and have black oxide surface treatment to provide superior wear resistance. Precision bits are crafted from premium M2 high-speed steel and are hardened and tempered for long life and high performance. The 60-piece jobbers degree drill bit set includes sizes #1 to #60 and wire gauge sizes #1 to #60. *Visit TESSCO.com or call 800-472-7373 for more information.*

TESSCO Part No. 463329
Wire Gauge Drill Set, 60 Pc.
List: $86.00 Bronze: 68.89

Wire Gauge Drill Bit Set

Do Repetitive Cutting and Stripping with Ease

Your **Wireless Solutions®** 30-13 AWG precision, self-adjusting wire stripper and cutter is made from high-impact polymers and carbon steel to ensure long life of your tool. The compact pistol-grip design gives you increased control and greater precision vital for stripping smaller cables and wires. Autoform laminated stripping jaws form around the radius of the cable to ensure no damage to the inner conductor when your strip is made. The built-in wire stop provides a precise measurement of strip length. This ergonomically designed professional wire stripper/cutter fits easily into your tool kit or use at the bench.

Visit TESSCO.com or call 800-472-7373 for more information.

TESSCO Part No. 439645
30-13 AWG Wire Stripper
List: $69.95 Bronze: $58.06

30-13 AWG Wire Stripper

Prices shown are for comparison only*

Wireless Solutions® Hi-Visibility Spanner Wrench Exclusive

Designed for technicians that install connectors, collars, rings and locknuts, these **Wireless Solutions®** heavy-duty, adjustable jaw spanner wrenches are hot drop-forged, alloy tool steel that are heat-treated for long-life use. The Rockwell body hardness is 41-43 HRc and is tested to meet and exceed ASME B107.25M standards. The adjustable hook-type head pivots freely and has a well-secured hinge-pin. Exclusive to TESSCO, the heavy-duty spanner wrench handles feature Hi-Visibility orange cushion grips for easy location and fast identification. Your USA-made wrenches meet or exceed government specifications and have approved N.S.N. identification. *Visit TESSCO.com or call 800-472-7373 for more information.*

TESSCO Part No. 421530
3/4" to 2" Adjustable Jaw Wrench, 6-1/2" OAL
List: $17.50 Bronze: 13.04

TESSCO Part No. 499550
1-1/4" to 3" Adjustable Jaw Wrench, 8-1/2" OAL
List: $14.70 Bronze: 10.96

TESSCO Part No. 418508
2" to 4-3/4" Adjustable Jaw Wrench, 11-1/4" OAL
List: $17.50 Bronze: 13.04

1-1/4 to 3-Inch Adjustable Jaw Wrench

Fiber Optic Terminations Made Easy

The **Wireless Solutions®** basic fiber termination kit offers you a complete fiber optic connector installation solution for ST, SC and LC connectors. The kit contains the tools and consumables to properly terminate connections using anaerobic adhesive for permanent low-loss terminations. Your kit includes the following:

Basic Fiber Termination Kit

- 203µM No-Nik Jacket Stripper
- Buffer Stripper
- Electrician's Scissors
- Crimp Tool and Die
- Sapphire Scribe
- Plastic Parts Box
- Marker
- Ruler
- Polishing Fixture
- Polishing Pad
- 100x Microscope
- OptiCure 100 Primer
- OptiCure 100 Adhesive
- Syringes
- Needle Tips
- Safety Glasses
- Water Bottle
- Alcohol Bottle
- Wipes, 100/pk
- 1µM and 5µM Polishing Film
- Kit Key
- Templates
- Ballistic Nylon Case, 15"L x 12"W x 6"H

Visit TESSCO.com or call 800-472-7373 for more information.

TESSCO Part No. 454515
Basic Fiber Termination Kit
List: $850.00 Bronze: 749.72

Screwdriver and Bit Set Travel Together

Designed by technicians for technicians, your **Wireless Solutions®** 32-in-1 field service screwdriver set features a magnetic bit with bit block sleeve, that slips over the driver shaft and holds 32 of the most frequently used 1/4-inch S-2 tool steel hex drive bits. Your magnetic bit-holding screwdriver features a spin-top amber storage handle. The driver includes the following:

- (1) Magnetic Bit Holding Screwdriver
- (3) Phillips Bits: #0, #1, #3
- (3) Phillips Bits: #2
- (7) Torx Bits: T6, T7, T8, T10, T15, T20, T25
- (3) Square Recess Bits: #1, #2, #3
- (6) Slotted Bits: 3-4, 5-6, 6-8, 8-10, 10-12, 12-14
- (7) SAE Hex Bits (inch): 5/64, 3/32, 7/64, 1/8, 9/64, 5/32, 3/16
- (2) Clutch Bits (inch): 5/32, 3/16
- (1) 1/4" Square Drive to 1/4" Hex Drive Adapter
- (1) Black Bit Holder

Visit TESSCO.com or call 800-472-773 for more information.

32-in-1 Field Service Screwdriver Set

TESSCO Part No. 421640
32-in-1 Field Service Screwdriver Set
List: $15.80 Bronze: 13.51

Remove Fine Scratches and Abrasions from Cell Phones and PDAs Safely!

NOVUS Fine Scratch Remover for cell phones and PDAs is specially designed to leave a lustrous shine that resists fogging, repels dust, eliminates static and protects against smudges and scratching. Many manufacturers recommend using this product to clean LCD lenses. It is very good for use on Mylar. It works well on plastics, as well as video game monitors, control panels, and marquee plastics. It is great for cleaning and removing scratches from CDs and DVDs. You can also use on cars, trucks, boats, RVs, snow mobiles and motorcycle windshields, helmets and glasses, skylights, auto interiors, dash board gauges, radio face plates and turntable covers, plastic signs, safety shields, airplane windows, copiers, fax machines, cash registers, bullet-proof glass, and many other products made from plastic and acrylic such as Plexiglass, LEXAN, Lucite, UVEX, and Acrylite. *Visit TESSCO.com or call 800-472-7373 for more information.*

TESSCO Part No. 467587
Fine Scratch Remover
List: $6.00 Bronze: 5.38

Fine Scratch Remover

Certifying Cable Installations on Time and Without Penalties

(continued from page 2)

a shift differential and/or an overtime premium to get the job completed on time and without penalties.

Conclusion

Choosing a cable certification solution that offers network professionals significant dollar savings by reducing the amount of time to certify is the best possible choice, especially when performance is at issue. An up-front investment in a high-quality tester always pays off in the long run.

For additional information on cable certification solutions, contact TESSCO at 1-800-472-7373.

1 The junior technician going from one outlet to the other needs the time to move to the next link to be tested. The technician in the TR unplugs the test adapter and plugs into an adjacent panel outlet. The speed with which a tester completes a certification test does not influence or modify the time to move from outlet to outlet. In our calculations, this average moving time is considered a fixed time that depends on the layout of the building and the number of outlets per office (and the motivation of the technicians).

Product information and performance claims are provided by manufacturers.

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The all-new Your Total Source® *Solutions Guide* is packed with over 34,000 wireless products from 450 manufacturers. This comprehensive guide offers everything you need to build, run, maintain, and use wireless. And our 35 illustrated applications detail everything you need to solve your most difficult wireless solution. Looking for more specific information? Our series of targeted guides complement the *Solutions Guide*. Perfect for use in the field, these guides are designed to give you exactly what you need, when and where you need it.

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Wireless Networking Solutions Guide | *Wireless Devices & Accessories Specialty Guide* | *Wireless Technician's Solutions Guide* | *Your Total Source® Solutions Guide and CD*

TESSCO Is Your Total Source for GSA-Approved Products

With over 15,000 GSA-approved products from nearly 200 manufacturing partners, TESSCO is the only wireless supplier with three GSA contracts in the wireless space. Manage all of your purchases under one account AND enjoy better overall pricing with TESSCO's GSA Program!

TESSCO's GSA Awarded Schedules

Test & Measurement—GSA Schedule No. GS-24F-0090N

- Spectrum Analyzers
- Multimeters
- Data Network Analyzers
- Repeaters
- Bench/Test Equipment (including soldering equipment)

Hardware Superstore—GSA Schedule No. GS-06F-0008P

- Tools and Tool Kits
- Installation Supplies (fuses, cable ties, wire)
- Hardware/Electrical Products
- Fuses
- Power Tools

Information Technology—GSA Schedule No. GS-35F-0548P

- Security Cameras and Security Products
- Wireless Broadband Products (Microwave Unlicensed)
- Antennas
- Coaxial Cable
- Connectors
- Amplifiers
- Tower/Site Support Components—and more!

If you are a current TESSCO customer and federal buyer, please e-mail gsa@tessco.com to receive the GSA-approved product listing and pricing guide.

If you are a federal buyer and wish to establish an account with TESSCO, please register by completing the form on TESSCO.com/go/gsa. The approved GSA product listing and pricing guide will be forwarded to you.

34,000 Products from over 450 Manufacturers

Products from the following manufacturers are featured in this issue:

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Aluma-Form
Alvarion
Andrew Corporation
Anritsu
Antenex
Astron Wireless
Bird Electronic Corporation
Bud Industries
Cellular Specialties Inc.
Centurion
CPI
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RF Connectors
RIM
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Price Matters, but Your Total Cost Matters MORE!

Your Total Source® Pricing Is Uniquely Simple!

- No minimum dollar or bulk requirement
- No need to best-price shop
- No haggling or hidden charges

Pricing Levels Reward You for Buying

Combined Spending (products valued at list)	
Reward Pricing	**Level**
Less than $250	List
Greater than $250	Bronze
Greater than $1,000	Silver
Greater than $5,000	Gold
Greater than $15,000	Platinum

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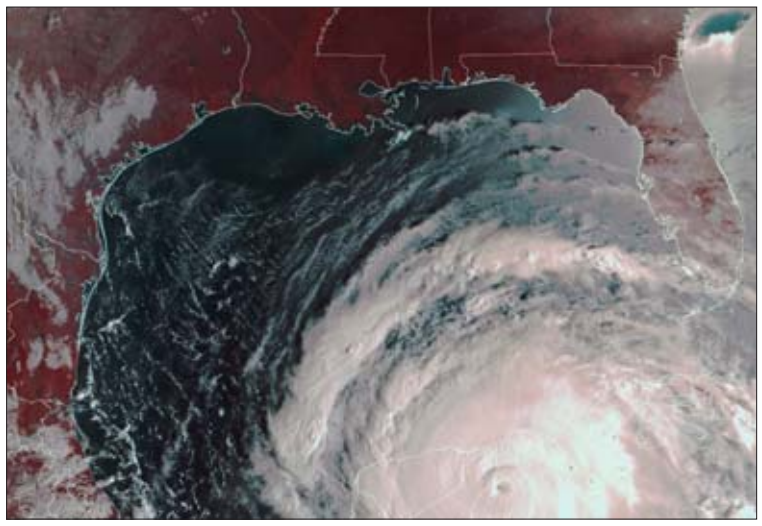
Will You Be Ready When Disaster Strikes?



Natural and even man-made disasters rarely give you much time or warning. TESSCO has made it easier to plan for emergency situations—before they arise. You don't need expensive special survival gear and supplies. TESSCO has assembled a basic list of items to help you survive a disaster. While you won't need all of them, we can show you what you're missing.

The industry has decided 72 hours is a reasonable length of time for you to handle yourself until government and volunteer services respond. TESSCO, as Your Total Source for disaster preparedness, can help you make it through the various natural disasters, including hurricanes, tornados, earthquakes, mudslides, snow storms, etc. *Call TESSCO at 800-472-7373 or visit TESSCO.com for a listing of personal comfort, survival, communication, safety, tools, and miscellaneous items valuable during emergency situations.*

TESSCO Helps in Time of Need

"Once again TESSCO rose to the occasion. In the past three and one-half weeks, we have suffered an assault from not one, but two hurricanes. I called my sales rep and told him what we needed to effect emergency repairs. I had all the product the next day, and was able to bring up emergency communications for the local law enforcement agencies who were down because major facilities failed as a result of 145 mph winds. Thanks TESSCO."

Mike Gilchrist
DayStar Communications
Port Charlotte, Florida

TESSCO customer, Jim Richardson, St. Lucie County, Florida, called in to have three tower sites re-established after being knocked down by Hurricane Francis. He needed these with all of the guy wiring, lightning protection and other products stocked by TESSCO. With help from the TESSCO team, Jim's sales rep not only got all the products delivered on time but created a very enthusiastic and delighted customer.

Succeed in the Wireless Market

VAR Alliance Program

TESSCO is committed to helping our resellers, integrators, and dealer partners succeed in the wireless marketplace. By locating, sourcing, and bundling the latest wireless products into complete solutions, TESSCO provides VARs a wide offering of new revenue opportunities.

The **TESSCO VAR Alliance Program** is designed to deliver the tools and training necessary to sell, install, and support the innovative wireless networking solutions that end users are demanding today.

Additionally, the program takes a vertical market approach to selling wireless solutions to commercial, education, and government entities via advertising and direct marketing programs.

Vertical Markets

- K-12 Education Program
- College & University Program
- Health Care Program
- Public Safety Program
- ISP Program

Program Goals

- Increase overall revenue opportunities for wireless networking solutions
- Increase VAR gross margin by packaging and selling total solutions
- Increase revenue for VARs within their existing customer base by introducing new wireless applications
- Identify and target new markets and new customers

Benefits to VARs

- Sales leads generated through TESSCO's vertical marketing campaigns
- Technology map of the "Wireless Marketplace"
- Sales and technical tools for the identified vertical markets
- Wireless networking design tools
- Sales and technical training

VAR Alliance Road Shows

Attend a TESSCO VAR Alliance Road Show in your area. Contact TESSCO today for more information about the VAR Alliance Program at varalliance@tessco.com.

Fantastic Finishes as Wireless Professionals Converge with PGA Tour

On August 19-22, 2004, TESSCO hosted over two hundred customers, contractors, and manufacturers at the Reno-Tahoe Open (RTO). This PGA tournament was held at the prestigious Montreux Golf and Country Club in Reno, Nevada. The event treated everyone to a four-player, sudden death, playoff won by newcomer Vaughn Taylor on the 18th hole. Guests witnessed this exciting finish from TESSCO's hospitality tent perfectly positioned behind the finishing hole.

TESSCO—a named sponsor for the RTO—selected this opportunity to express appreciation to key partners and stakeholders, to share information, and to foster relationships for further business growth throughout the West. Additionally, TESSCO's sponsorship supported the local community, charities, and further evidenced TESSCO's commitment to the territory. Incorporated into the four-day PGA event was a Manufacturers' Symposium, as well as tours and strategy sessions at TESSCO's 115,000 square foot, 17-acre Americas Sales and Logistics Center, located adjacent to the Reno International Airport.

While the momentum of the RTO provided entertainment and education, it was just a prelude to TESSCO's successful Wireless Industry Symposium held the following Monday (August 23) at the Siena Hotel Spa and Casino *(see article below)*.

TESSCO Hosts Wireless Industry Symposium in Reno

THE Wireless Industry Symposium

The Wireless Industry Symposium held in August integrated manufacturers, customers, and industry experts for a full day of knowledge sessions, tour of TESSCO's 115,000 square foot, 17-acre, Americas Sales and Logistics Center and a trade show. Customers had their choice of 12 sessions in three tracks and saw the hottest products while interacting with our manufacturer partners.

According to the August 24th issue of the *Reno Gazette-Journal*, "Manufacturers, end users, sellers and utility representatives mingled while listening to presentations and seminars about various wireless topics, including Federal Communications Commission regulations, marketing wireless technology, public and site safety and mobile services.

"Alan Tilles, attorney for the Personal Communications Industry Association, gave an update on FCC regulations. He urged private radio and land mobile businesses to join forces to voice their concerns about increasing interference on registered radio frequencies.

"'There is no active, united professional front,' Tilles said. 'You must take an active role in changing things. One way to do that is by working with all industry trade associations.'

He said that political factors also affect regulations on the two-way radio industry. (*A summary of regulatory issues by Alan Tilles can be found on page 1 of* The Wireless Journal.)

Besides providing information about the general state of wireless industry, customer Kyle Rather said the symposium afforded him a place to talk with experts about the equipment he uses every day."

The event culminated with a lively cocktail hour, highlighted by a "Spin the Wheel" at which every customer walked away with a prize.

It was a first for Reno—at the TESSCO wireless events, everyone was a winner!

Return Those Report Cards to Win!

You may be a winner! Monthly winners receive a $250 certificate and the Grand Prize drawing winner receives a $1,000 certificate toward TESSCO products!

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Pelican Mobile Company, Inc.
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Alexandria, Louisiana

Visit TESSCO at These Exciting Industry Events

SHOW: Educause, Denver, CO
DATES: 10/19-22
WEB: www.educause.edu

SHOW: WCA, San Jose, CA
DATES: 12/12-14
WEB: www.wcai.com

SHOW: WEST 2005 San Diego, CA
DATES: 2/1-2/3
WEB: www.afcea.org

SHOW: NATE, Dallas, TX
DATES: 2/14-2/17
WEB: www.natehome.com

SHOW: CTIA, New Orleans, LA
DATES: 3/13-3/16
WEB: www.ctiashow.com

SHOW: UTC, Long Beach, CA
DATES: 5/22-5/24
WEB: www.utctelecom2005.utc.org

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